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NTA UGC NET PAPER 1

TOPIC-WISE

52 SOLVED PAPERS (2020 to 2004)

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UGC-NET EXAM

ABOUT THE UGC-NET EXAM

- The UGC-NET exam for Junior Research Fellowship/Eligibility for Assistant Professor, earlier conducted by the CBSE, is being conducted by the National Testing Agency (NTA) in online mode from Dec 2018. There is no change suggested in the syllabus for June 2019 exam, but the exam pattern has been revised.
- There will be two papers with a total of 300 marks.

Paper 1	**General Aptitude**	**1 hour**	**50 Qs**	**100marks**
Paper 2	**Optional Subject**	**2 hours**	**100 Qs**	**200 marks**

- **All questions, worth 2 marks each, will be compulsory; and, there will be no negative marking.**

1. (Five questions each carrying 2 marks are to be set from each Unit-The details of syllabus as below)

SYLLABUS

Unit-I Teaching Aptitude

- Teaching: Concept, Objectives, Levels of teaching (Memory, Understanding and Reflective), Characteristics and basic requirements.
- Learner's characteristics: Characteristics of adolescent and adult learners (Academic, Social, Emotional and Cognitive), Individual differences.
- Factors affecting teaching related to: Teacher, Learner, Support material, Instructional facilities, Learning environment and Institution.
- Methods of teaching in Institutions of higher learning: Teacher centered vs. Learner centered methods; Off-line vs. On-line methods (Swayam, Swayamprabha, MOOCs etc.).
- Teaching Support System: Traditional, Modern and ICT based.
- Evaluation Systems: Elements and Types of evaluation, Evaluation in Choice Based Credit System in Higher education, Computer based testing, Innovations in evaluation systems.

Unit-II Research Aptitude

- Research: Meaning, Types, and Characteristics, Positivism and Post- positivistic approach to research.
- Methods of Research: Experimental, Descriptive, Historical, Qualitative and Quantitative methods.
- Steps of Research.
- Thesis and Article writing: Format and styles of referencing.
- Application of ICT in research.
- Research ethics.

Unit-III Comprehension

- A passage of text to be given. Questions to be asked from the passage to be answered.

Unit-IV Communication

- Communication: Meaning, types and characteristics of communication.
- Effective communication: Verbal and Non-verbal, Inter-cultural and group communications, Classroom communication.
- Barriers to effective communication.
- Mass-Media and Society.

Unit-V Mathematical Reasoning and Aptitude

- Types of reasoning.
- Number series, Letter series, Codes and Relationships.
- Mathematical Aptitude (Fraction, Time & Distance, Ratio, Proportion and Percentage, Profit and Loss, Interest and Discounting, Averages etc.).

Unit-VI Logical Reasoning

- Understanding the structure of arguments: argument forms, structure of categorical propositions, Mood and Figure, Formal and Informal fallacies, Uses of language, Connotations and denotations of terms, Classical square of opposition.
- Evaluating and distinguishing deductive and inductive reasoning.
- Analogies.
- Venn diagram: Simple and multiple use for establishing validity of arguments.
- Indian Logic: Means of knowledge.
- Pramanas: Pratyaksha (Perception), Anumana (Inference), Upamana (Comparison), Shabda (Verbal testimony), Arthapatti (Implication) and Anupalabddhi (Non-apprehension).
- Structure and kinds of Anumana (inference), Vyapti (invariable relation),Hetvabhasas (fallacies of inference).

Unit-VII Data Interpretation

- Sources, acquisition and classification of Data.
- Quantitative and Qualitative Data.
- Graphical representation (Bar-chart, Histograms, Pie-chart, Table-chart and Line-chart) and mapping of Data.
- Data Interpretation.
- Data and Governance.

Unit-VIII Information and Communication Technology (ICT)

- ICT: General abbreviations and terminology.
- Basics of Internet, Intranet, E-mail, Audio and Video-conferencing.
- Digital initiatives in higher education.
- ICT and Governance.

Unit-IX People, Development and Environment

- Development and environment: Millennium development and Sustainable development goals.
- Human and environment interaction: Anthropogenic activities and their impacts on environment.
- Environmental issues: Local, Regional and Global; Air pollution, Water pollution, Soil pollution, Noise pollution, Waste (solid, liquid, biomedical, hazardous, electronic), Climate change and its Socio-Economic and Political dimensions.
- Impacts of pollutants on human health.
- Natural and energy resources: Solar, Wind, Soil, Hydro, Geothermal,Biomass, Nuclear and Forests.
- Natural hazards and disasters: Mitigation strategies.
- Environmental Protection Act (1986), National Action Plan on Climate Change, International agreements/efforts -Montreal Protocol, Rio Summit,Convention on Biodiversity, Kyoto Protocol, Paris Agreement, International Solar Alliance.

Unit-X Higher Education System

- Institutions of higher learning and education in ancient India.
- Evolution of higher learning and research in Post Independence India.
- Oriental, Conventional and Non-conventional learning programmes in India.
- Professional, Technical and Skill Based education.
- Value education and environmental education.
- Policies, Governance, and Administration.

UGC NET PAPER 1 TOPIC WISE SOLVED PAPERS-2020
SET I & II

UNIT I: Teaching Aptitude

1. Which of the following emotional characteristics are of crucial significance in adolescent learning?

[Ch-2 Learner's Characteristics-Set I]

(a) Feeling of group belongingnes
(b) Hero-worship and sentiments
(c) Expanding emotional ties with those in the neighbourhood
(d) Dependence processes and making friends

2. Which of the following factors contributing to school learning are termed as social competence?

A. Motivation B. Intelligence
C. Social skills D. Family support
E. Specific abilities of the learner

[Ch-3 Factors Affecting Teaching-Set II]

Choose the correct answer from the options given below:

(a) A, C and D only (b) A, B and C only
(c) B, C and D only (d) C, D and E only

3. Identify from the following, those features of key behaviours which are contributive to the effectiveness of teaching

A. Lesson clarity which implies making ideas clear to the learner
B. Questioning-implying fact and concept based questions
C. Probing involving eliciting and soliciting moves
D. Teacher-task orientation with a focus on outcomes of the unit clearly defined
E. Engagement in the learning process which implies the amount of time students devote to learning

[Ch-3 Factors Affecting Teaching-Set II]

Choose the correct answer from the options given below:

(a) A, B and C only (b) B, C and D only
(c) A, D and E only (d) B, D and E only

4. Given below are two statements, one is labelled as **Assertion A** and the other is labelled as **Reason R**.

Assertion A: It is the responsibility of the teacher to make students active listeners with the help of different interactive techniques.

Reason R: In teacher-centric communication, students tend to become passive listeners.

In light of the above statements, choose the correct answer from the options given below

[Ch-3 Factors Affecting Teaching-Set II]

(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is NOT the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

5. During teaching when a teacher uses process questions which of the following types will have dominance?

A. Direct questions
B. Higher order questions
C. Convergent questions
D. Indirect questions
E. Concept based questions

[Ch-4 Methods of Teaching in Institutions of Higher Learning-Set I]

Choose the correct answer from the options given below:

(a) (A), (B) and (C) only
(b) (B), (C) and (D) only
(c) (C), (D) and (E) only
(d) (B), (D) and (E) only

6. Given below are two statements :

Statement I : Tutorials, group discussions and question-answer sessions are dialogic and are part of direct teaching methods.

Statement II : Project work, Laboratory work, simulation and role playing are action based and are part of indirect teaching methods.

In the light of the above statements, choose the most appropriate answer from the options given below :

[Ch-4 Methods of Teaching in Institutions of Higher Learning-Set I]

(a) Both Statement I and Statement II are correct
(b) Both Statement I and Statement II are incorrect
(c) Statement I is correct but Statement II is incorrect
(d) Statement I is incorrect but Statement II is correct

7. What is the focus of concern in understanding level teaching?

[Ch-4 Methods of Teaching in Institutions of Higher Learning-Set I]

(a) Promotion of scope for seeking of relationship among facts and ideas
(b) Encouraging recall and recognition of facts and information
(c) Raising of problems and seeing solutions to problems so presented
(d) Developing a sense of happiness and ownership in learning

8. In the spectrum of teaching methods given below, which are considered dialogic?

A. Laboratory work B. Demonstration
C. Tutorials D. Group discussion
E. Project work

[Ch-4 Methods of Teaching in Instututions of Higher Learning-Set II]

Choose the correct answer from the options given below

(a) C and D only (b) A and B only
(c) B and C only (d) D and E only

9. Teaching differs from training and conditioning in so far as it promotes *[Ch-5 Teaching Support System-Set II]*

(a) Disciplined drill (b) Critical thinking
(c) Steady association (d) Mastery of facts

UNIT II: Research Aptitude

10. Identify the qualitative research characteristics from the following :

A. Exploring a problem and developing a detailed understanding of a central phenomenon.
B. Having the literature review play a minor role but justifying the problem.
C. Describing a research problem through a description of trends.
D. Collecting numeric data from a large number of people using instruments with present questions.
E. Collecting data based on words from a small number of individuals. *[Ch-8 Method of Research-Set I]*

Choose the correct answer from the options given below:
(a) (A), (B) and (C) only
(b) (A), (B) and (E) only
(c) (B), (C) and (D) only
(d) (C), (D) and (E) only

11. Which of the following methods is used in empirical researches? *[Ch-8 Method of Research-Set I]*
(a) Inductive method (b) Deductive method
(c) Initiative method (d) Scientific method

12. Which of the following research is intervention-based, cyclic in nature and improvement focused? *[Ch-8 Method of Research-Set II]*
(a) Case study research (b) Survey research
(c) Experimental research (d) Action research

13. Given below are two statements :
Statement I : Maximum performance tests are designed to assess the upper limits of the examinee's knowledge and abilities.
Statement II : Typical response tests are designed to measure the behaviour and characteristics of examinees.
In the light of the above statements, choose the most appropriate answer from the options given below : *[Ch-9 Steps of Research-Set I]*
(a) Both Statement I and Statement II are correct
(b) Both Statement I and Statement II are incorrect
(c) Statement I is correct but Statement II is incorrect
(d) Statement I is incorrect but Statement II is correct

14. When the independent variable is explored rather than manipulated, to observe the effect on dependent variable, the method of research is called, *[Ch-9 Steps of Research-Set I]*
(a) Ex-post facto method
(b) Experimental method
(c) Case study method
(d) Descriptive survey method

15. Identify the probability sampling procedures from the following :
(A) Quota sampling (B) Stratified sampling
(C) Dimensional sampling (D) Cluster sampling
(E) Systematic sampling *[Ch-9 Steps of Research-Set I]*
Choose the correct answer from the options given below:
(a) (A), (B) and (C) only (b) (B), (C) and (D) only
(c) (B), (D) and (E) only (d) (C), (D) and (E) only

16. Using an appropriate parametric test in a research project, the researcher finds evidence to reject the Null hypothesis. In doing so, which type of error is likely? *[Ch-9 Steps of Research-Set II]*
(a) Alpha error
(b) Beta error
(c) Both Alpha and Beta errors
(d) Neither Alpha nor Beta error

17. Match List I with List II.

List I **Sampling techniques used in research**	**List II** **Description**
A. Simple random sampling	I. The units are identified in terms of various specific features identified before drawing a sample structure
B. Systematic sampling	II. Each unit is given an equal independent chance of being picked up
C. Dimensional sampling	III. The k-interval is obtained by N/n and the units are drawn using the same, where N is population size and n is desired sample size.
D. Snowball sampling	IV. First member unit is used to identify the second unit and so on

[Ch-9 Steps of Research-Set II]
Choose the correct answer from the options given below:
(a) A-I, B-IV, C-II, D-III (b) A-II, B-III, C-I, D-IV
(c) A-IV, B-II, C-III, D-I (d) A-III, B-I, C-IV, D-II

18. Given below are two statements, one is labelled as **Assertion A** and the other is labelled as **Reason R**.
Assertion A : Empirico-inductive paradigm in research focuses on meaning-giving subjective perspectives to depict reality.
Reason R : The purpose of research in this paradigm is not to arrive at generalizations but to discover the reality as lived.
In light of the above statements, choose the **most appropriate** answer from the options given below: *[Ch-9 Steps of Research-Set II]*
(a) Both A and R are correct and R is the correct explanation of A
(b) Both A and R are correct but R is NOT the correct explanation of A
(c) A is correct but R is not correct
(d) A is not correct but R is correct

19. A college/university teacher plans to test his/her substantive research hypothesis in a major project. Which of the following statements are considered relevant in this regard?

A. Substantive research hypothesis has to clearly specify the relationship among variables
B. Research hypothesis may be directed at finding out differential effects or relationships
C. Null hypothesis should be formulated beforehand
D. There is direct support available for testing the substantive research hypothesis
E. The final decision on the research hypothesis may be reached indirectly by deciding the fate of the Null hypothesis *[Ch-9 Steps of Research-Set II]*

Choose the correct answer from the options given below:
(a) A, B and C only (b) B, C and D only
(c) A, D and E only (d) A, B and E only

20. Match List I with List II.

List I Methods of estimating the reliability of a test	List II Description
A. Test-retest method	I. Administering the test in one session with two equivalent halves of the test for correlation
B. Alternate form method	II. Two or more raters score the test independently
C. Split-half method	III. Administering the same test to the same group at two different sessions
D. Inter-rater method	IV. Administering the two forms of the test to the same group at two different sessions

[Ch-9 Steps of Research-Set II]

Choose the correct answer from the options given below:

(a) A-I, B-II, C-III, D-IV (b) A-II, B-I, C-IV, D-III
(c) A-IV, B-III, C-II, D-I (d) A-III, B-IV, C-I, D-II

21. A 'De-novo' institution is characterized by

[Ch-11 Application of ICT in Research-Set I]

(a) ICT enabled pedagogy
(b) focus on teaching and research in unique and emerging areas of knowledge
(c) focus on teaching and research on foreign languages and their literature
(d) state of art infrastructure

22. Which of the following ICT initiatives of MHRD deal with E-governance for institutions/ universities?

[Ch-11 Application of ICT in Research-Set I]

(a) SAMARTH (b) VIDWAN
(c) IRINS (d) SWAYAM

23. Match List I with List II

List I ICT Initiatives of Ministry of Human Resource Development	List II Their benefits for students and researchers
A. SWAYAM	I. To get hands-on experience in embedded system
B. SWAYAM-PRABHA	II. To get free books and curriculum-based e-content
C. e-PG Pathshala	III. To watch high-quality educational programmes
D. e-Yantra	IV. To earn credits through online courses

[Ch-11 Application of ICT in Research-Set II]

Choose the correct answer from the options given below:

(a) A-III, B-IV, C-I, D-II (b) A-IV, B-III, C-II, D-I
(c) A-II, B-I, C-IV, D-III (d) A-I, B-II, C-III, D-IV

UNIT III: Comprehension

Comprehension : (Qs. 24-28)

Read the passage and answer questions from 46 to 50.

If so much of present day cultural learning depends on situation and context how do the resulting assemblages acquire an organised coherence? One way this issue is being raised in recent anthropology is through the concern with identity, whether defined as identity of the person of an ethnic group or of an entire nation. But identities do not swim above in the stream of social life like amoebas in fermenting banana soup. If definitions of identity involve a characterisation of attributes and a drawing of boundaries around the units so defined, in contrast with other units, this must have a causal context. Moreover, we know that the search for identity varies historically, intensifying or slackening over periods of time. Thus, a major rise occurred in the demand for identity with the advent of the nation-state and the collateral development of nationalism, which hoped to create a unified and identifiable 'people', out of diverse populations with distinctive identities of their own. Recently, the demand for identities has risen once again, precisely at a time when cultural repertoires are becoming again more heterogeneous, as people have responded to changes in the social division of labour, in their relation to governments, in reaction to new modes of communication. These repertoires of cultural understandings and practices do not easily fit any traditional notion of culture as an integral and integrated set of forms and meanings. *[Ch-13 Comprehension-Set I]*

24. Historically the search for identity has been of

(a) Uniform continuity (b) Slackening of culture
(c) Intermittent intensity (d) Illogical motives

25. The advent of nationalism led to

(a) Competing identities
(b) Single identity across the nation
(c) The emergence of a unified cultural repertoire
(d) Unity within diverse identities

26. The identity has a tendency to have

(a) Different attributes from others
(b) Coherence with other units
(c) Undistinguishable boundaries
(d) The movement above the stream of social life

27. What is the focal issue in the present day cultural learning?

(a) Unending discussions on it
(b) Contextual clarity
(c) Anthropological concern
(d) The need to organise the issue properly

28. The new cultural understanding does not fit into the traditional notion of culture due to

(a) New modes of communication
(b) Traditional social divisions of labour
(c) Integrated sets of meanings
(d) The creation of a strong nation-state

Comprehension :(Qs. 29-33)

Read the passage carefully and answer questions that follow -

Marketers are reexamining their relationships with social values and responsibilities and with the very Earth that sustains us. As the worldwide consumerism and environmentalism movement mature, todays marketers are being called on to develop sustainable marketing practices. Corporate ethics and social responsibility have become hot topics for almost every business. And few companies can ignore the renewed and very demanding environmental movement. Every company action can affect customer relationships. Today's customers expect companies to deliver value in a socially and environmentally responsible way. The social-responsibility and environmental movements will place even stricter demands on companies in the future. Some companies resist these movements, budging only when forced by legislation or organized customer outcries. Forward-looking

companies, however, readily accept their responsibilities to the world around them. They view sustainable marketing as an opportunity to do well by doing good. They seek ways to profit by serving immediate needs and the best long-run interest of their customers and communities.

Some companies, such as Patagonia, Ben & Jerrys, Timberland, Method, and others, practice caring capitalism, setting themselves apart by being civic-minded and responsible. They build social linkages. *[Ch-13 Comprehension-Set II]*

29. What do farsighted companies prefer?
(a) Sustainable marketing
(b) Legislative compulsion
(c) Organized consumer pressure
(d) Status quo in the market

30. According to the passage, sustainable marketing is perceived as
(a) Immediately profitable
(b) Community fallacy
(c) Doing good to community as an opportunity
(d) Long-term burden to society as a difficult issue

31. The concern for today's society centres on
(a) Marketing strategies (b) Customer relations
(c) Corporate ethics (d) Delivery of value for money

32. The present-day marketers have focused on
(a) Consumerism
(b) Social obligations
(c) Sustaining their business practices
(d) Competitive business

33. Caring capitalism is inclusive of
A. Make profit by ignoring social demands
B. Being civic-minded
C. Forging social linkages
D. Budge when there is a legislative nudge
Choose the correct answer from the options given below:
(a) A and B only (b) B and C only
(c) C and D only (d) A and D only

UNIT IV: Communication

34. The entry of new media has made online learning : *[Ch-14 Communication-Set I]*
(a) Secondary source based
(b) Dependent on personal sources
(c) Institution-centric
(d) Independent

35. Match List I with List II.

List I (Mode of Communication)	List II (Type of communication)
(A) One-to-one	(I) Network (transactional)
(B) One-to-many	(II) Intra-personal
(C) Many-to-many	(III) Inter-personal
(D) One-to-none	(IV) Mass Communication especially print

[Ch-14 Communication-Set I]
Choose the correct answer from the options given below:
(a) (A)-(I), (B)-(II), (C)-(III), (D)-(IV)
(b) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)
(c) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)
(d) (A)-(IV), (B)-(I), (C)-(II), (D)-(III)

36. Identify the correct sequence of phases in communication development :
(A) Acta Diurna
(B) Cave paintings
(C) Wooden blocks for printing
(D) Development of languages
(E) Metal printing
[Ch-14 Communication-Set I]
Choose the correct answer from the options given below:
(a) (A), (B), (D), (C), (E)
(b) (B), (D), (C), (A), (E)
(c) (C), (D), (E), (A), (B)
(d) (D), (E), (A), (B), (C)

37. Match List I with List II

List I Type of communication	List II Characteristics
A. Intra-personal	I. Between persons
B. Inter-personal	II. within a small organization
C. Group	III. Large number of unknown audience
D. Mass	IV. Within oneself

[Ch-14 Communication-Set II]
Choose the correct answer from the options given below:
(a) A-I, B-II, C-III, D-IV
(b) A-II, B-III, C-IV, D-I
(c) A-III, B-IV, C-I, D-II
(d) A-IV, B-I, C-II, D-III

38. Given below are two statements
Statement I: Personality conflicts in a classroom situation are a barrier to effective interaction
Statement II: Impersonal communication is invariably considered the best solution in a `classroom environment
In light of the above statements, choose the correct answer from the options given below
[Ch-15 Effective Communication-Set II]
(a) Both Statement I and Statement II are true
(b) Both Statement I and Statement II are false
(c) Statement I is correct but Statement II is false
(d) Statement I is incorrect but Statement II is true

39. Efficacy of written communication depends upon
A. Lengthy presentation
B. Complex sentence structure
C. Editing after writing
D. Brevity in sentences
E. Use of strong words
F. Effective use of words
[Ch-15 Effective Communication-Set II]
Choose the correct answer from the options given below:
(a) A, B and C only (b) B, C and D only
(c) C, D and F only (d) D, E and F only

40. The concept fraction of selection in classroom communication is determined by the expectation of reward related to *[Ch-15 Effective Communication-Set II]*
(a) Efforts needed (b) Reviews needed
(c) Peer pressure needed (d) Time-lag needed

41. Removal of communication barriers in a classroom will result in
(A) Clear enunciation of specific instructional behaviours
(B) A climate of purposeful student interaction
(C) Promotion of personality cult
(D) The irrelevance of illustrative examples
[Ch-16 Barriers to Effective Communication-Set I]
Choose the correct answer from the options given below:
(a) (A) and (B) only (b) (B) and (C) only
(c) (C) and (D) only (d) (A) and (D) only

42. Given below are two statements : One is labelled as **Assertion (A)** and the other is labelled as **Reason (R).**
Assertion (A) : Repeating more and more the same message will make it important.
Reason (R) : 'Don't use two words when one will do' is the guiding principle that works.
In the light of the above statements, choose the most appropriate answer from the options given below :
[Ch-16 Barriers to Effective Communication-Set I]
(a) Both (A) and (R) are correct and (R) is the correct explanation of (A)
(b) Both (A) and (R) are correct but (R) is NOT the correct explanation of (A)
(c) (A) is correct but (R) is not correct
(d) (A) is not correct but (R) is correct

43. What is the remainder when 45 is divided by 15?
[Ch-17 Mass-Media and Society-Set I]
(a) 4 (b) 5
(c) 8 (d) 11

UNIT V: Mathematical Reasoning and Aptitude

44 What is the missing number?
4, –8, 16, (?), 64, –128
[Ch-19 Numerical Series Letter Series, Codes and Relationship-Set I]
(a) –24 (b) –32
(c) 24 (d) 30

45. In terms of the relationship indicated below, which word will correctly pair to replace the question mark?
Worse : Bad : : Doting : ____?_____
[Ch-19 Numerical Series Letter Series, Codes and Relationship-Set I]
(a) Reverence (b) Fond
(c) Hate (d) Dislike

46. In the following letter series, what is the next term?
abcf, bcdg, cdeh, defi, _____
[Ch-19 Numerical Series Letter Series, Codes and Realtionship-Set II]
(a) efij (b) efgi
(c) efgj (d) defj

47. Identify the next term in the series
[Ch-19 Numerical Series Letter Series, Codes and Realtionship-Set II]
2, 10, 26, 50, ?
(a) 78 (b) 94
(c) 82 (d) 104

48. Given below are two statements :
Statement I : In research, 'Null hypothesis' when rejected, offers the scope for accepting the alternative or substantive research hypothesis.
Statement II : When the Null hypothesis is rejected, there will be chances for committing 'Beta' rather than 'Alpha' error.
In the light of the above statements, choose the most appropriate answer from the options given below :
[Ch-20 Mathematical Aptitude-Set I]
(a) Both Statement I and Statement II are correct
(b) Both Statement I and Statement II are incorrect
(c) Statement I is correct but Statement II is incorrect
(d) Statement I is incorrect but Statement II is correct

49. Given below are two statements :
Statement I : Sometimes, Ratio has units.
Statement II : When two ratios are equal, a proportion is formed.
In the light of the above statements, choose the correct answer from the option given below :
[Ch-20 Mathematical Aptitude-Set I]
(a) Both Statement I and Statement II are true
(b) Both Statement I and Statement II are false
(c) Statement I is correct but Statement II is false
(d) Statement I is incorrect but Statement II is true

50. What is the actual profit when the profit on selling price is 25%? *[Ch-20 Mathematical Aptitude-Set I]*
(a) 33.33% (b) 30.33%
(c) 25% (d) 20%

51. Given below are two statements :
Statement I : Co-primes are the numbers which have only 1 as their common factor.
Statement II : Factorisation is the decomposition of a number into the other numbers which when added together will give the original number.
In the light of the above statements, choose the correct answer from the options given below :
[Ch-20 Mathematical Aptitude-Set I]
(a) Both Statement I and Statement II are true
(b) Both Statement I and Statement II are false
(c) Statement I is correct but Statement II is false
(d) Statement I is incorrect but Statement II is true

52. A man in a train notices that he can count 31 telephone poles in one minute. If the poles are at equal intervals of 50m, what is the speed of the train?
[Ch-20 Mathematical Aptitude-Set II]
(a) 50 km/hour (b) 60 km/hour
(c) 80 km/hour (d) 90 km/hour

53. Given three numbers, first is twice the second and is half of the third. If the average of three numbers is 56, then the difference of first and third number is
[Ch-20 Mathematical Aptitude-Set II]
(a) 12 (b) 24
(c) 36 (d) 48

54. A sum of Rs. 500,000.00 is invested in a bank deposit for 1 year at an interest rate of 10 % per annum, compounded on a half-yearly basis. What is the amount of interest at the end of 1 year? *[Ch-20 Mathematical Aptitude-Set II]*
(a) 5125 (b) 5250
(c) 5500 (d) 5150

UNIT VI: Logical Reasoning

55. Given below are two statements :
Statement I : Some examinations are too long.
Some examinations are too difficult.
Therefore, some examinations are too long and too difficult.
Statement II : Some dogs chase cats.
All dogs have fleas.
Therefore, some cat-chasing dogs have fleas.
In the light of the above statements, choose the correct answer from the options given below :
[Ch-24 Venn Diagram-Set I]
(a) Both Statement I and Statement II are true
(b) Both Statement I and Statement II are false
(c) Statement I is correct but Statement II is false
(d) Statement I is incorrect but Statement II is true

56. Given below are four propositions. Two of them are related in such a way that they cannot be true, although they can be false. Select the code that states those two propositions
[Ch-24 Venn Diagram-Set II]
A. All men are honest
B. No men are honest
C. Some men are honest
D. Some men are not honest
Choose the correct answer from the options given below:
(a) A and B only (b) B and C only
(c) C and D only (d) A and D only

57. Arrange in sequence the following theory of causality in Aristotle's philosophy :
(A) Material cause (B) Efficient cause
(C) Formal cause (D) Final cause
[Ch-25 Indian Logic: Means of Knowledge-Set I]
Choose the correct answer from the options given below:
(a) (A), (C), (B), (D) (b) (A), (D), (B), (C)
(c) (C), (B), (A), (D) (d) (A), (B), (C), (D)

58. Given below are two statements :
Statement I : Human reason has this peculiar fate that it reaches at a stage when it can neither answer certain questions nor can it ignore such questions.
Statement II : Human reason, by its own nature, is not competent to resolve certain questions concerning the ultimate reality.
In the light of the above statements, choose the most appropriate answer from the options given below :
[Ch-25 Indian Logic: Means of Knowledge-Set I]
(a) Both Statement I and Statement II are correct
(b) Both Statement I and Statement II are incorrect
(c) Statement I is correct but Statement II is incorrect
(d) Statement I is incorrect but Statement II is correct

59. What is the sequential order of a comprehensible sentence in Nyaya philosophy
A. Akanksha B. Yogyata
C. Tatparya D. Sanniddhi
[Ch-25 Indian Ligic : Means of Knowledge-Set II]
Choose the correct answer from the options given below
(a) D, C, B, A (b) A, B, D, C
(c) C, D, B, A (d) D, C, A, B

60. The sequential order of syllogism in Nyaya philosophy is
A. Nigman B. Udaharana
C. Hetu D. Upanaya
E. Pratigya
[Ch-25 Indian Ligic : Means of Knowledge-Set II]
Choose the correct answer from the options given below
(a) A, E, C, D, B (b) E, C, B, A D
(c) E, B, C, D, A (d) D, A, B, C, E

61. Given below is a proposition :
'The weather is very cold today'.
Which one of the following, according to Nyaya, is the correct option? *[Ch-26 Pramanas-Set I]*
A. Samanya lakshana
B. Yogaja
C. Jnanalakshana
D. Sannikarsha
Choose the most appropriate answer from the options given below :
(a) (A) only (b) (B) only
(c) (C) only (d) (D) only

62. Paravidya, according to the vedic tradition, implies :
[Ch-27 The Structure of Inference (Anumana)-Set I]
(a) Knowledge based on human experience
(b) Knowledge that transcends human experience
(c) Knowledge acquired from teachers
(d) Knowledge acquired from texts

63. 'To infer rain in the past by perceiving muddy water in the pond', is
[Ch-27 The Structure of Inference (Anumana)-Set II]
(a) Purvovat Anumana
(b) Sesvatanuman
(c) Both Purvovat Anumana and Sesvatanuman
(d) Comparison

64. The fallacy (hetvabhasha) produced in the conclusion due to the repudiation of Sadhya by Hetu is known as
[Ch-27 The Structure of Inference (Anumana)-Set II]
(a) Savyabhichra (b) Viruddha
(c) Satpratipaksha (d) Asiddha

UNIT VII: Data Interpretation

Comprehension : (Qs. 65-69)
The following table shows the total number of beds in each hospital in bracket and the number of patient admitted at different hospitals for a disease on a particular day. Based on the data in the table, answer the questions 1-5 :

Hospital / Disease	A (100)	B (50)	C (100)	D (50)
Viral disease	30	15	35	10
Heart disease	35	10	30	10
Kidney disease	15	5	15	5
Liver disease	10	5	5	15

[Ch-31 Data Interpretation-Set I]

65. What is the ratio of total patients admitted to Hospital A to Hospital B?
(a) 19 : 7 (b) 17 : 7
(c) 18 : 7 (d) 7 : 17

66. What is the ratio of patient admitted for viral disease to kidney disease?
(a) 9 : 4 (b) 7 : 4
(c) 8 : 3 (d) 10 : 4

67. What is the percentage of Liver disease patient admitted in all the hospitals from the total patients admitted?
(a) 15% (b) 16%
(c) 13% (d) 14%

68. Which disease occupies highest number of beds in all the hospitals?
(a) Heart Disease (b) Viral Disease
(c) Kidney Disease (d) Liver Disease

69. What is the total percentage of unutilized beds?
(a) 19.44% (b) 17.66%
(c) 16.66% (d) 15.44%

Comprehension : (Qs. 70-74)

Consider the data in the given table and answer the questions that follow:

The following table is on the Expenditures of Institution (in lakh Rupees) per annum over the given years

Heads of Expenditure (in lakhs)

Year	Salary of Staff	Transport	Bonuses	Interest on loan	Taxes
2015	288	98	3	23.4	83
2016	342	112	2.52	32.5	108
2017	324	101	3.84	41.6	74
2018	336	133	3.68	36.4	88
2019	420	14	3.96	49.4	98

[Ch-31 Data Interpretation-Set II]

70. What is the average amount of interest per year that the institution had to pay?
(a) 30.50 (b) 36.66
(c) 39.66 (d) 41.02

71. The total amount of bonus paid by the institution during the given period is approximately what percent of the total amount of salary paid during this period?
(a) ~3.96% (b) ~4%
(c) ~7% (d) ~1%

72. Total expenditure on all these items in 2015 was approximately what per cent of the total expenditure in 2019?
(a) 84.63% (b) 58%
(c) 91% (d) 73.96%

73. The total expenditure of the institution on these items during the year 2017 is
(a) 624.6 (b) 524.44
(c) 544.44 (d) 591.41

74. The ratio between the expenditure on taxes for the years 2016 and 2018, is approximately
(a) 17 : 11 (b) 27 : 22
(c) 31 : 27 (d) 19 : 17

UNIT VIII: Information and Communicaiton Technology

75. Consider the following technologies :
(A) Microprocessor
(B) Transistor
(C) Vaccum Tube
(D) Artificial Intelligence
Arrange the above technologies of different computer generations in the order they have been used. Start from the technology that was used in first generation.

[Ch-33 Information and Communication Technology (ICT)-Set I]

Choose the correct answer from the options given below:
(a) (C), (A), (B), (D) (b) (C), (B), (A), (D)
(c) (B), (C), (A), (D) (d) (C), (B), (D), (A)

76. Given below are two statements :
Statement I : World Wide Web is not an example of client-server technology.
Statement II : FTP is a service available on the internet.
In the light of the above statements, choose the correct answer from the options given below :

[Ch-34 Basic of Internet-Set I]

(a) Both Statement I and Statement II are true
(b) Both Statement I and Statement II are false
(c) Statement I is correct but Statement II is false
(d) Statement I is incorrect but Statement II is true

77. Extra browser window of commercials that open automatically on browsing web pages is called

[Ch-34 Basic of Internet-Set I]

(a) Spam (b) Virus
(c) Phishing (d) Pop-up

78. Given below are two statements, one is labelled as **Assertion A** and the other is labelled as **Reason R**.
Assertion A: Total number of mobile users in India is increasing rapidly
Reason R: The cost of the mobile is decreasing
In light of the above statements, choose the most appropriate answer from the options given below

[Ch-34 Basic of Internet-Set II]

(a) Both A and R are correct and R is the correct explanation of A
(b) Both A and R are correct but R is NOT the correct explanation of A
(c) A is correct but R is not correct
(d) A is not correct but R is correct

79. Which of the following statements is/are true?
(A) Fibre optic cables are wooden fibres to provide high quality transmission.
(B) Wireless communication provides anytime, anywhere connection to both computes and telephones.
(C) Mobile phones are capable of providing voice communication and also digital messaging service.

[Ch-35 Digital Initiatives in Higher Education-Set I]

Choose the correct answer from the options given below:
(a) (A) and (C) only (b) (B) and (C) only
(c) (A) and (B) only (d) (C) only

80. What is the binary number for decimal number 9?

[Ch-35 Digital Initiatives in Higher Education-Set II]

(a) 1100 (b) 1001
(c) 0111 (d) 1011

81. The file extension of Microsoft (MS) Word document in office 2007 is

[Ch-35 Digital Initiatives in Higher Education-Set II]

(a) .docx (b) .png
(c) .doc (d) .jpg

82. What is the full form of the abbreviation loT?

[Ch-36 ICT and Governance-Set II]

(a) International Office of Tourism
(b) Internet of Things
(c) Internet of Think
(d) Instrument of Telecommunication

UNIT IX: People, Development & Environment

83. The underlying purpose of environmental education is to:

(A) Adjust to environmental challenges
(B) Help face environmental hazards
(C) Promote individual's critical-thinking about emerging issues
(D) Increase public awareness and knowledge of environmental issues.
(E) Enhance problem-solving and decision-making skills in respect of handling environmental issues.

[Ch-37 Development & Environment-Set I]

Choose the correct answer from the options given below:

(a) (A), (B), (C) only (b) (B), (C), (D) only
(c) (C), (D), (E) only (d) (D), (E), (A) only

84. Identify the primary air pollutant among the following :

[Ch-38 Human and Environment Interaction-Set I]

(a) Ozone
(b) Black carbon aerosols
(c) Sulphate aerosols
(d) Peroxy Acetyl Nitrate (PAN)

85. Identify the correct sequence of countries in decreasing order of their contributions to per capita emissions of carbon dioxide emissions at present

A. India B. China
C. USA D. Japan

[Ch-38 Human and Environment Interaction-Set II]

Choose the correct answer from the options given below

(a) C, D, B, A (b) B, C, A, D
(c) D, B, C, A (d) C, B, D, A

86. Given below are two statements :

Statement I : Long stretches of major rivers of India have very low Biochemical Oxygen Demand (BOD) values.

Statement II : In rivers oxygen is added into water by diffusion from air due to its turbulent and rapid flow.

In the light of the above statements, choose the most appropriate answer from the options given below :

[Ch-39 Environmental Issues-Set I]

(a) Both Statement I and Statement II are correct
(b) Both Statement I and Statement II are incorrect
(c) Statement I is correct but Statement II is incorrect
(d) Statement I is incorrect but Statement II is correct

87. The only UN treaty related to environmental issues which has been ratified by all 197 UN member states is

[Ch-39 Environmental Issues-Set I]

(a) Montreal Protocol (b) Paris Agreement
(c) Kyoto Protocol (d) Basel Convention

88. The phenomenon of ozone depletion is caused by

A. Volatile chlorinated hydrocarbons
B. Emissions from thermal power plants
C. Combustion of urban waste
D. Excessive use of nitrogen-containing fertilizers

[Ch-39 Environmental Issues-Set II]

Choose the correct answer from the options given below:

(a) A, B and D only (b) A and D only
(c) A, B and C only (d) A, C and D only

89. Day time noise standard prescribed for residential areas in India is

[Ch-40 Impacts of Pollutants on Human Health-Set II]

(a) 75 dB (b) 65 dB (c) 55 dB (d) 50 dB

90. Which type of memory holds the computer startup routine?

[Ch-40 Impacts of Pollutants on Human Health-Set II]

(a) RAM (b) WAN (c) ROM (d) Cache

91. 'Solar Water Still' is a device to

[Ch-41 Natural and Energy Resources-Set I]

(a) Produce potable water by using solar energy
(b) Pump water by using solar energy
(c) Generate electricity by using solar energy
(d) Produce heat using solar energy

92. As of now, which of the following is a leading country in wind energy based electricity generation?

[Ch-41 Natural and Energy Resources-Set I]

(a) India (b) China
(c) France (d) Denmark

93. Given below are two statements, one is labelled as **Assertion A** and the other is labelled as **Reason R**.

Assertion A: In the contemporary environmental discourse, small hydropower plants are preferred over large hydropower plants

Reason R: Installation of a small hydropower plant is less capital intensive compared to a large hydropower plant

In light of the above statements, choose the most appropriate answer from the options given below

[Ch-41 Natural and Energy Resources-Set II]

(a) Both A and R are correct and R is the correct explanation of A
(b) Both A and R are correct but R is NOT the correct explanation of A
(c) A is correct but R is not correct
(d) A is not correct but R is correct

94. Which of the following was NOT an issue to be addressed under Millenium Development Goals?

[Ch-43 Environmental Protection Laws of India-Set II]

(a) Child mortality (b) Environmentalsustainability
(c) Human rights (d) Primary education

UNIT X Higher Education System

95. Takshashila, an ancient centre for higher learning in India, was declared as a heritage site by the UNESCO in

(a) 1980 (b) 1982
(c) 1984 (d) 1986

96. Gross Enrolment Ratio (GER) in higher education is the total enrolment in higher education, regardless of age expressed as a percentage to the eligible official population in a given school year. Which of the following age groups explain the eligible official population in this regard?

[Ch-45 Evolution of Higher Learning and Research in Post Independence India-Set II]

(a) 16 - 21 years (b) 17 - 22 years
(c) 18 - 23 years (d) 19 - 24 years

97. MOODLE is abbreviation of

[Ch-47 Professional, Technical and Skill-Based Education-Set I]

(a) Modular Object-Oriented Distance Learning Environment
(b) Modular Object-Oriented Dynamic Learning Environment
(c) Modular Object-Oriented Distance Legislative Environment
(d) Modular Object-Oriented Distance Legal Environment

98. Which of the following statements best describe value education?

[Ch-48 Value Education and Environmental Education-Set II]

A. It is a course in moral science
B. It talks about rewards and punishments for one's own actions
C. Students observe and imitate adult behaviours, particularly that of their parents
D. Students investigate and explore their own inner self
E. It encourages students to fix their place in their life

Choose the correct answer from the options given below:

(a) A, B and C only (b) B, C and D only
(c) C, D and E only (d) A, D and E only

99. MHRD, Govt. of India, scheme 'RUSA' supports the following components :

[Ch-49 Policies, Governance and Administration-Set I]

(A) Upgrading autonomous colleges to the status of a University
(B) Providing maintenance grants to state Universities
(C) Setting up of new professional colleges in un-served and under-served areas of the country
(D) Providing infrastructure grants to colleges and universities to scale up capacity
(E) More scholarship programmes to supplement the cost of education

Choose the correct answer from the options given below:

(a) (A), (B), (D) and (E) only
(b) (A), (B), (C) and (E) only
(c) (B), (C), (D) and (E) only
(d) (A), (C), (D) and (E) only

100. Rashtriya Uchchatar Shiksha Abhiyan (RUSA), a Centrally Sponsored Scheme aiming at providing strategic funding to eligible state higher educational institutions, was launched in *[Ch-49 Policies, Governance and Administration-Set II]*

ANSWERS & EXPLANATIONS

1. **(b)** Adolescence is the age of transition from childhood into adulthood marked by extra sensitivity and over sentimentality as adolescents grapple with biological and psychological changes within themselves and dwell in confusion regarding their identity. This makes them distance themselves from all that they experienced as children (including parents' indulgence, adults' authority, rules, group belongingness, emotional ties with neighbours, dependence on friends, etc.) , and hero worship adults whom they fancy. So, these emotional characteristics are of crucial significance in case of adolescent learning; and, teachers must acknowledge this and act accordingly.

2. **(a)** Social competence is the condition of possessing the social, emotional, and intellectual skills and behaviours needed to succeed as a member of society. Social competence consists in social, emotional and cognitive skills and behaviours that school learners require for successful adaptation to the society as they grow into its constituent adult members. Individual intelligence and special abilities of the learner play a part in their academic achievement rather than in their social competence; which is determined, instead, by family support, motivation and social skills they have.

3. **(a)** Lesson clarity for clear understanding of the learner; questioning to test grasp of facts and concepts; and probing to guide and lead to the required moves and/or responses are key behaviours for effective teaching. Teacher-task orientation with a focus on outcomes of the unit clearly defined (statement D); and, students' engagement in the learning process which implies the amount of time they devote to learning (statement E) is to be realised optimally; however, neither is a determinant of effective teaching.

4. **(a)** The teacher is the captain of the classroom- ship, being responsible for how the teaching-learning process is steered within. So, s/he may choose from teacher-centric, student-centric or interactive/participative methods for transacting the lesson. It is important to keep students active and involved in the teaching learning process to maintain the desired level of their interest and motivation and make them active listeners of the teacher's communication. Therefore, teaching methods wherein students are passive listeners are not effective. Hence, it is the responsibility of the teacher to make students active listeners with the help of different interactive techniques (Assertion A) because in teacher-centric communication, students tend to become passive listeners (Reason R).

5. **(d)** Process questions are used to test the depth of one's knowledge on a subject (concept based questions) and one's ability to analyze how the various components/ processes of a system contributed to create the whole; so, higher order and indirect questions are predominantly asked.Convergent questions and direct

questions have one direct answer; so, neither tests depth of knowledge.

6. (a) Dialogic communication involves a two-way communication process between two, e.g., tutorials, group discussion and question answer sessions, which are also direct teaching methods. So, statement I is true. On the other hand, project work, lab work, simulation and role-playing are action based and are part of indirect teaching methods.

7. (a) According to Bloom's Taxonomy, teaching happens at three levels of cognition/thoughtfulness: memory (least thoughtful), understanding (thoughtful) and reflective (most thoughtful). While the memory level pertains to remembering of facts and ideas, the understanding level is concerned with the scope for exploring the relationship between principles/ideas and facts. So, (a) is correct.

The reflective level of teaching/cognition pertains to application of learning to solve problems.

8. (a) Dialogic teaching/learning is that which takes place through dialogue. Apart from achieving some cognitive results, dialogue also transforms social relations in the learning environment. It is an interactive/participatory/collaborative effort between the teacher and the taught to gain knowledge and experience. Lab work as well as project work is done by students alone on a given set of instructions; and demonstration is delivered by the teacher alone while the students remain passive recipients. A tutorial involves an instructor working with individual learner, and a group discussion involves interactive/ collaborative learners working on a given topic; so both are dialogic processes.

9. (b) Teaching is generally theoretical and abstract, while training is practical and concrete. Teaching aims to impart knowledge and develop critical thinking, while training seeks to develop abilities. However, both teaching and training comprise disciplined drill, steady association and mastery of facts.

10. (b) **Qualitative research** involves exploring a problem and developing a detailed understanding of a central phenomenon; having the literature review play a minor role but justifying the problem; and, collecting **data based on words** from a **small** number of individuals. On the other hand, describing a research problem through a description of trends; and collecting **numeric** data from a **large** number of people are characteristics of **quantitative research**.

11. (d) Inductive method aims at developing a theory while deductive method aims at testing an existing theory. However, empirical research uses the scientific method of making hypotheses, deriving predictions from them as logical consequences, and then carrying out experiments or empirical observations based on those predictions to test the hypothesis and arrive at a conclusion.

Initiative research is meaningless, research initiatives are taken to study research problems.

12. (d) Action research is a cyclical ($\rightarrow$ Plan $\rightarrow$ Act $\rightarrow$ Observe $\rightarrow$ Reflect $\rightarrow$) process of participatory, intervention-based, self-reflective, problem-solving research aimed at improving the ongoing practices in a system, institution, etc. A case study is an in-depth study of a complex phenomenon in its real-life context. A survey research is a list of questions aimed at extracting specific data from a particular group of people. An experimental research uses two sets of variables, independent variables that are manipulated by the researcher, and the dependent that are measured and compared.

13. (a) Maximum Performance Test is designed to test the limits of the persons' knowledge and abilities. Can either be CORRECT or INCORRECT

Typical Response Test measures things like personality, behaviour, attitudes or interests.

14. (a) Ex post facto study or 'after-the-fact' research is a category of research design in which the investigation starts after the fact has occurred without interference (no manipulation of independent variable) from the researcher.

15. (c) Probability sampling involves random selection, which means that every member of the population has a chance of being selected. It allows the researcher to make statistical inferences about the whole group. Probability sampling methods are simple random, systematic, stratified and cluster sampling.

Non-probability sampling involves non-random selection based on convenience or other criteria, allowing the investigator to easily collect initial data. Non-probability sampling methods include convenience, purposive, snowball, dimensional, quota and voluntary response sampling.

16. (c) In statistical hypothesis testing, the researcher uses an appropriate parametric test to find evidence to reject the null hypothesis in favour of the alternative hypothesis. Depending on whether the null hypothesis is true or false in the target population, and assuming that the study is free of bias, 4 situations are possible: In 2 of these, the findings/evidence in the sample and reality in the population are in agreement, and the researcher's inference is correct. In the other 2 situations, either a type I or a type II error has been made, and the inference is incorrect. The type I error, called alpha (α), consists in rejecting the null hypothesis when it is actually true; and the type II error, called beta (β), consists in failing to reject the null hypothesis when it is actually false.

17. (b) A-II, B-III, C-I, D-IV

18. (d) Inductive research aims at developing a new theory (as against deductive research, which aims at testing an existing theory); and empirical research involves using empirical evidence which means evidence based on, concerned with, or verifiable by means of

direct and indirect observation or experience (rather than theory or pure logic).

So, assertion (A) is incorrect because empirical data has no scope for subjective (or personal) perspectives. However, (R) is correct because to discover the reality as lived is akin to finding new theory.

19. (d) A substantive hypothesis is a set of assumptions/ expectations about the actual properties and relation between two or more variables (observational units) which has not yet been put into use, as distinguished from statistical hypothesis which is put to use in hypothesis testing.

A substantive research hypothesis clearly specifies direct or indirect relationship among variables; so, A is relevant.

Differential effects exist when the relationship of a predictor, x, to an outcome, y, differs across subsets of individuals. Research hypothesis may be directed at finding out differential effects or relationships; so B also is relevant.

Null hypothesis is formulated after substantive research hypothesis; so, C is not correct. Direct support is not available for testing the substantive research hypothesis (which makes D irrelevant); its validity is confirmed by testing the null hypothesis (which makes E correct)

20. (d) A-III, B-IV, C-I, D-II

21. (b) A 'De-novo' educational institution is characterised by its focus on teaching and research in unique and emerging areas of knowledge.

22. (a) Department of Higher Education, Ministry of Human Resource Development (MHRD) has developed an e-Governance platform, SAMARTH Enterprises Resource Planning (ERP), under the National Mission of Education in Information and Communication Technology Scheme (NMEICT).

SAMARTH is an Open Standard Open Source Architecture, Secure, Scalable, and Evolutionary Process Automation Engine for Universities and Higher Educational Institutions.

23. (b) SWAYAM is a programme initiated by Government of India and designed to achieve the three cardinal principles of Education Policy viz., access, equity and quality. The objective of this effort is to take the best teaching learning resources to all, including the most disadvantaged. SWAYAM seeks to bridge the digital divide for students who have hitherto remained untouched by the digital revolution and have not been able to join the mainstream of the knowledge economy. The SWAYAM PRABHA is a group of 34 DTH channels devoted to telecasting of high-quality educational programmes on 24X7 basis using the GSAT-15 satellite. e-PG Pathshala is an initiative of the MHRD under its National Mission on Education through ICT (NME-ICT) being executed by the UGC. The content and its quality being the key component of education system, high quality, curriculum-based, interactive e-content in 70 subjects across all disciplines of social sciences, arts, fine arts and humanities, natural & mathematical sciences, linguistics and languages have been developed by the subject experts working in Indian universities and other R & D institutes across the country. e-Yantra Robotics Competition (eYRC) is a unique annual competition launched in the month of August every year for undergraduate students in science and engineering colleges, polytechnic.

24. (c) The author of the passage says that the search for identity varies historically, slackening or intensifying over periods of time. So, it has intermittent intensity rather than a uniform continuity. The other two options are irrelevant.

25. (d) As per the passage, with the creation of nation-states, the sense of nationalism developed which united a group of diverse population on the basis of shared nationalism. So, option (d) is correct. Option (a) is incorrect because competition on any basis, nationality or other, has not been mentioned in the passage. Within a nation of diverse people, national identity was shared but people could have 'distinctive identities of their own'; so, option (b) is incorrect. Option (c) is incorrect because 'unified cultural repertoire' does not hold a diverse population within a nation.

26. (a) The passage states that definitions of identity involve a 'characterisation of attributes' and 'drawing of boundaries around units' in order that they are distinct and 'in contrast with other units'. So, option (a) only holds.

27. (b) The very first sentence of the passage clearly mentions that present day cultural learning depends on situation and 'context'.

28. (a) The passage mentions that 'new modes of communication' have changed 'social division of labour' and brought in globalisation with crumbling boundaries; because of which 'cultural repertoires are becoming more heterogeneous'; so , this new cultural understanding does not fit into the traditional notion of culture.

29. (a) Far-sighted or forward-looking companies promptly accept the fact that they have some responsibilities to the world around them. They look at sustainable marketing as an opportunity to to do good business by doing good to the society; to serve their own interests (i.e., make profit) by serving the immediate needs as well as long-term interest of their customers and communities.

Companies with a non sustainable, myopic vision do not budge until there is legislative compulsion or organized consumer pressure. Companies always look to improvement, rather than status quo in the market.

30. (c) According to the passage, forward looking companies view sustainable marketing as an opportunity to do well by doing good to communities. In other words, corporate house see that by being socially and environmentally responsible, being ethical in their business pursuits, and serving the immediate needs as well as the long-term interests of their customer base (the community), they can win their trust and nurture sustained customer relations, which in turn will only benefit their business pursuits.

31. **(c)** The passage says that today's customers expect companies to deliver value in a socially and environmentally responsible way. This is to say, today's society is concerned more about corporate ethics (option c) and corporate social responsibility; and they value the companies that show action in this direction. So, unless companies adopt these, they cannot build sustained customer relations; which means customer relations (option b) is the concern of the corporate rather than the society. So are marketing strategies (option a) and delivery of value for money (option d).

32. **(c)** The passage says, that present day marketers are far-sighted; instead of immediate short-term gains, which come from promoting consumerism (option a) and competitive business (option d); they **focus** on **sustaining their business practices** (option b)for which they build consumer trust and forge long-term relations with the community by showing social obligations/ responsibility (option c).

33. **(b)** The passage says, forward-looking companies practice caring capitalism; they set themselves apart from the run-of-the-mill by being ethically, socially and environmentally responsible in their business practices (so, A is not included); by being civic-minded (so, B is included); and by building social linkages/ relations (so, C is included). It is the short-sighted companies that are unethical and irresponsible, and budge only when there is a legislative nudge (so, D is not included).

34. **(d)** New media refers to means of mass communication using digital technologies such as the internet. The internet has enabled online learning which enables an individual student to learn course modules/programmes independently, instead of being dependent on traditional institution-centric learning (c); or secondary source based learning, i.e., by teachers who taught from primary sources (books); or personal sources (by asking, watching, reading, thinking, feeling, talking).

35. **(c)** The correct match of mode of communication with its type is shown below:

Mode of communication	**Type of communication**
A. One-to-one	I. Interpersonal
B. One-to-many	IV. Mass communication especially print.
C. Many-to-many	I. Network (transactional)
D. One-to-none	II. Intra-personal

36. **(b)** Cave paintings were the earliest form of communication dating back to the ice age; studies suggest language first evolved around 50,000–150,000 years ago, which is around the time when modern Homo sapiens evolved and the oldest scriptures of surviving languages like Hebrew and Tamil date back to 10th century BCE; wooden block-printing was first done on cloth in China around 220AD; Acta Diurna was the first newspaper published in Rome, around 59 BC; and metal printing or 3D printing began in 1981 in Japan.

37. **(d)** A-IV, B-I, C-II, D-III

38. **(c)** The ideal classroom situation is a positive environment where effective teaching-learning interaction takes place; the teacher is well-meaning, organized and compassionate, and sets the tone for the entire classroom; and the students work harmoniously to attain specific learning goals set out before them. If personality conflicts, either between/among students or between student and teacher takes place, it raises tempers, disrupts harmony and vitiates the positive environment; which acts as a barrier/ hindrance to effective interaction. So, statement I is true.

Impersonal communication consists in considering communication recipients not as persons but as objects, and responding to their roles/position/function instead of them as individual persons. So, this is not at all suitable in a classroom environment, where the teacher is expected to ideally build a rapport with the learners and be responsible for each member as a distinct individual person. Thus, statement II is false.

39. **(c)** Lengthy presentation (A) causes weariness, Complex sentence structure (B) obstructs a smooth flow of message (meaning/understanding); and Use of strong words (E) invokes negative emotions; so , all of these hamper the efficacy of written communication. On the other hand, Editing after writing (C) eliminates undesirable content while Brevity in sentences (D) and Effective use of words (F) cause the intended message to travel across with the least impediment.

40. **(a)** The 'fraction of selection' formula developed by Wilbur Schramm in 1954 determines the form of mass media an individual is likely to select, which indicates the quantum of reward an individual would expect to gain from the medium selected with respect to the effort they would have to make for achieving it.

41. **(a)** Some common barriers to effective communication in the classroom are listening barriers, perception barriers, oral barriers and cultural barriers. Recognizing and overcoming these barriers is essential for effective classroom communication. Removal of these barriers ensures clear enunciation of specific instructional behaviour (A) and a climate of purposeful student interaction (B).

On the other hand, promotion of personality cult (C) is itself a barrier to effective communication; and so is irrelevance of illustrative examples (ID).

42. **(d)** Repeating the same message again and again doesn't make it important rather it increases redundancy. Using as less words as possible is advised while conveying a message, without compromising with its clarity.

43. **(a)** $4^5 \div 15 = 1024 \div 15$

Now, $1024 = 15 \times 68 + 4$

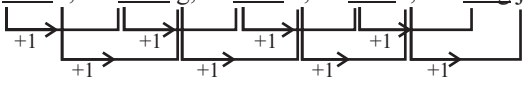
$\therefore$ Remainder = 4.

44. **(b)** 4, –8, 16, –32, 64, –128

×(–2) ×(–2) ×(–2) ×(–2) ×(–2)

45. (b) Worse and Bad are Synonumous word like that doting and fond are synonuymous word.

46. (c) a b c f, b c d g, c d e h, d e f i, e f g j



47. (c) 2, 10, 26, 50, **82**

$(1)^2 + 1$ $(3)^2 + 1$ $(5)^2 + 1$ $(7)^2 + 1$ $(9)^2 + 1$

48. (c) In statistical hypothesis testing, the researcher uses an appropriate parametric test to find evidence to reject the null hypothesis in favour of the alternative hypothesis (which can be substantive or statistical). So, statement I is true.

Depending on whether the null hypothesis is true or false in the target population, and assuming that the study is free of bias, 4 situations are possible: In 2 of these, the findings/evidence in the sample and reality in the population are in agreement, and the researcher's inference is correct. In the other 2 situations, either a type I or a type II error has been made, and the inference is incorrect. The type I error, called alpha (α), consists in rejecting the null hypothesis when it is actually true; and the type II error, called beta (β), consists in failing to reject the null hypothesis when it is actually false. So, statement II which supports a greater likelihood of beta error is incorrect.

49. (d) Ratio is a unitless quantity. And when two ratios are equal, it is called in proportion.

Hence, statement I is false, but statement II is true.

50. (a) Let selling price = 100

Then, profit $= 100 \times \frac{25}{100} = 25$

Cost price = 100 – 25 = 75

Actual profit % $= \frac{25}{75} \times 100 = 33.33\%.$

51. (c) A set of numbers or integers which have only 1 as their common factor i.e. their highest common factor (HCF) will be 1. Thus, statement 1 is correct.

Factorisation is the decomposition of a number into the other numbers but on adding these number, we can not get original number.

52. (d) Distance between two consecutive telephone poles = 50 m.

Distance covered by passing by 31 poles

$= (31 - 1) \times 50 = 1500$ m.

Time taken to cover 1500 m = 1 minute = 60 sec.

Speed of the train $= \frac{1500}{60} = 25$ m/sec.

Speed of the train (km/hr) $= 25 \times \frac{18}{5} = 90$ Km/hr.

53. (d) Let first number is x.

then second number is $\frac{x}{2}$

and third number is $2x$.

Average of the number $= \frac{\text{Sum of the numbers}}{\text{Number of the numbers}}$

$$\Rightarrow 56 = \frac{x + \frac{x}{2} + 2x}{3} \quad \Rightarrow 56 = \frac{7x}{6} \Rightarrow x = \frac{56 \times 6}{7} = 48$$

$\therefore$ Difference of first and third number $= 2x - x = x = 48$

54. (a) Sum (P) = 50,000

Rate of interest (r%) = 10% per annum

Time (t) = 1 year

As rate of interest is compounded half-yearly,

$\therefore$ Amount of interest (I)

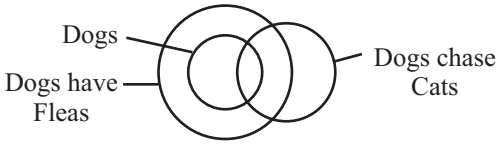
$$= P\left[\left(1 + \frac{r\%}{2}\right)^{2t} - 1\right] = 50000\left[\left(1 + \frac{10\%}{2}\right)^{2\times 1} - 1\right]$$

$$= 50000\left[\left(1 + \frac{5}{100}\right)^{2} - 1\right]$$

$= 50000\ [1.1025 - 1] = 5125.$

55. (d) Statement I is incorrect as some examinations are too long. Some examinations are too difficult. These are two different sentences correct individually. But that does not mean combined sentence of these two sentences are also correct.

Statement II is correct.



Therefore, some cats chasing dogs have fleas.

56. (a) Let the proposition "Some men are honest" are true, then "All men are honest" and "No men are honest" both cannot be true, although they can be false.

57. (a) Aristotle's theory of causality argues that change or 'becoming' is not an illusion; rather, humans actually experience nature as change; nor is reality some external given, but an experience one perceives. Humans can trust their experience, which for them is the only way of making sense of reality. Aristotle identifies four kinds of causes in the following sequence:

(i) material cause – This source of becoming is the material of which a thing is made. For example, a tree is experienced as a tree because it is made of wood.

(ii) formal cause – This source of becoming is the human experience of the form of the phenomenon as it moves toward its final form.

(iii) efficient cause – This source of becoming is human experience of change in terms of what went before the present state. For example, a tree is now experienced as being on fire because in the preceding state it was hit by lightning.

(iv) Final cause – This source of becoming is the purpose of a thing to be what it is. For a seed, it might be an adult plant; for a sailboat, it might be sailing; for a ball at the top of a ramp, it might be coming to rest at the bottom.

58. (a) The human mind conforms to certain principles in forming concepts and beliefs and theories, originally given, and these constrain the range of knowledge to which we have access. We cannot get beyond the specific kinds of data and modes of inference that characterise our knowledge-acquiring systems. So, statement I is correct.

Differing beliefs about God/Ultimate Reality are expressed in unique and divergent conceptual schemes, symbols, metaphors, and models, within which various questions arise concerning the nature and existence of this transcendent reality. As human experiences of God or Ultimate Reality is non-existent and part of folklore rather than reality, human reason can neither answer these questions nor ignore them. So, statement II is correct.

59. (b) In Nyaya philosophy, sabda pramana or verbal testimony (i.e., a sentence), in order to be comprehensible, must conform to 4 conditions in the sequential order shown below:

(i) *ākāṅkṣā* or syntactic expectancy of words
(ii) *Yogyatā* or semantic fitness of words
(iii) *Sanniddhi* or proximity/contiguity of words
(iv) *Tatparyā* or purport rather than literal meaning of words

60. (b) Nyāya philosophy employs a formal five-step syllogism in the following sequential order:

(i) *pratijñā* or thesis; {e.g., There is fire on the hill}
(ii) *hetu* or reason/probans {Because there is smoke on the hill}
(iii) *udāhara* or illustration of concomitance {Wherever there is smoke, there is fire; like a fireplace and unlike a pond}
(iv) *nigamana* or conclusion {Thus, there is fire on the hill}
(v) *upanaya* or application of the rule {This hill is likewise smoky}

61. (c) In Nyaya philosophy, the sub-classes of *Alaukika* (extraordinary/transcendental) type of *Pratyaksha pramana* are as follows:

(i) *Samanyalakshana Pratyaksha Pramana* is Universal or General Character Perception where all corresponding knowledge about an object comes by virtue of contact.

(ii) *Yogaja Pratyaksha Pramana* is Intuitive Perception or supra-sensual or intuitive perception.

(iii) *Gyanalakshana Pratyaksha Pramana* is Complicated Perception when object is known by its specific characteristics and understood through a particular sense organ. , e.g., ice makes one feel its coldness. Similarly, the proposition 'The weather is very cold today' infuses the sense of feeling cold; thus, it refers to this kind of *pramana*. *Sannikarsha*, on the other hand, refers to sense object contact. The ordinary perception (laukika) is caused by ordinary *sannikarsa* or sense object contact.

62. (b) Para Vidya means higher learning or learning related to the Self or the Ultimate Truth i.e. transcendental knowledge. Vedanta affirms that those who gain the knowledge of the Self attain Kaivalya, they become liberated, and they become Brahman.**Unit VII**

63. (b) Anummana are of three kinds:

(i) **Purvovat anumana**: inferring an unperceived effect from a perceived cause, e.g., inferring future rain from dark clouds.
(ii) **Sesvat anumana**: inferring an unperceived cause from a perceived effect, e.g., inferring past rain from muddy water.
(iii) **Samanyatrodasta anumana**: inferring from experience of uniformity instead of cause-effect relation, e.g., inferring motion of moon from the experience of its different positions after time intervals.

64. (b) The three terms of inference in Indian logic are Paksa (minor), Sadhya (major) and Hetu (middle); and fallacy of inference or erroneous reasoning is called hetvabhasa, which can be of different kinds.

(1) **Savyabhichâra** is the fallacy of irregular middle or defective hetu.

(2) **Viruddha** is the fallacy of the contradictory middle, wherein the offer to establish the existence of the sâdhya actually establishes the non-existence of the sâdhya; which means the hetu repudiates/rejects the sadhya. So, option 2 is the correct one.

(3) **Satpratipaka** is the fallacy of contradicted middle, wherein a hetu which is advanced to establish a particular sâdhya in an inference is validly contradicted by an another hetu which proves the non-existence of the sâdhya of the first inference.

(4) **Asiddha** is the fallacy of the unproved middle or the hetu which is not yet proved, but requires to be proved, like the sâdhya. This means that the asiddha hetu is not a proved or an established fact, but an asiddha or unproved assumption.

65. (c) Ratio

$$= \frac{\text{Number of patients admitted to Hospital A}}{\text{Number of patients admitted to Hospital B}}$$

$$= \frac{(30+35+15+10)}{(15+10+5+5)} = \frac{90}{35} = \frac{18}{7}.$$

66. (a) Ratio

$$= \frac{\text{Patient admitted for Viral disease}}{\text{Patient admitted for Kidney disease}}$$

$$= \frac{30+15+35+10}{15+5+15+5} = \frac{90}{40} = 9:4.$$

67. (d) Liver disease patient admitted in all hospitals
= 10 + 5 + 5 + 15 = 35.
Total patients admitted = 90 + 35 + 85 + 40 = 250.

$$\therefore \text{ Required percent } = \frac{35}{250} \times 100 = 14\%.$$

68. (b) Viral disease occupies highest number of beds in all the hospitals.

69. (c) Vaccant beds in Hospital A = 100 – 90 = 10
Vaccant beds in Hospital B = 50 – 35 = 15
Vaccant beds in Hospital C = 100 – 85 = 15
Vaccant beds in Hospital D = 50 – 40 = 10
Total vaccant beds = 10 + 15 +15 + 10 = 50.
Total number of beds = 100 + 50 + 100 + 50 = 300

$\therefore$ Required percent $= \frac{50}{300} \times 100 = 16.66\%.$

70. (b) Average amount of interest

$$= \frac{\text{Sum of total interest}}{\text{Number of years}}$$

$$= \frac{23.4 + 32.5 + 41.6 + 36.4 + 49.4}{5}$$

$$= \frac{183.3}{} = 36.66 \text{ lakhs per annum.}$$

71. (d) Total amount of Bonuses paid by the company
= 3 + 2.52 + 3.84 + 3.68 + 3.96 = 17 lakh.
Total amount of salary paid by the company
= 288 + 342 + 324 + 336 + 420 = 1710 lakh.

$\therefore$ Required percent $= \frac{17}{1710} \times 100 = 0.994\% \approx 1\%.$

72. (a) Total expenditure in 2015
= 288 + 98 + 3 + 23.4 + 83 = 495.4 lakh.
Total expenditure in 2019
= 420 + 14 + 3.96 + 49.4 + 98 = 585.36 lakh.

$\therefore$ Required percent $= \frac{495.4}{585.36} \times 100 = 84.63\%.$

73. (c) Total expenditure in 2017
= 324 + 101 + 3.84 + 41.6 + 74 = 544.44 lakhs.

74. (b) Ratio $= \frac{\text{Taxes in 2016}}{\text{Taxes in 2018}} = \frac{108}{88} = \frac{27}{22}.$

75. (b) Generations refer to the type of technology used to implement the processors.
1G: Vaccum tubes
2G: Transistors
3G : Integrated Circuits
4G: Microprocessors
5G: Artificial Intelligence

76. (d) The basic idea behind the World-Wide Web is based on a client server application and hypertext documents.

77. (d) A pop-up is a graphical user interface (GUI) display area, usually a small window that suddenly appears ("pops up") in the foreground of the visual interface. Pop-ups can be initiated by a single or double mouse click or rollover (sometimes called a mouseover), and also possibly by voice command or can simply be timed to occur. A pop-up window must be smaller than the background window or interface; otherwise, it's a replacement interface.

78. (d) In its last report telecom regulator TRAI revealed that India has 1.16 Bn wireless or mobile telecom subscribers, out of a population of between 1.3 and 1.4 Bn. On the face of it, mobile penetration seems to have reached a saturation point. Hence it is not increasing rapidly despite falling price of the mobile phones.

79. (b) A fibre optic cable is made from a glass or plastic core that carries light surrounded by glass cladding that (due to its lower refractive index) reflects "escaping" light back into the core, resulting in the light being guided along the fibre

80. (b) $(9)_{10} = 1 \times 2^3 + 0 \times 2^2 + 0 \times 2^1 + 1 \times 2^0 = (1001)_2.$

81. (a) Below is a list of common Windows file name extensions and formats.

doc	Microsoft Word document before Word 2007
docm	Microsoft Word macro-enabled document
docx	Microsoft Word document
dot	Microsoft Word template before Word 2007
dotx	Microsoft Word template

82 (b) The Internet of Things, or IoT, refers to the billions of physical devices around the world that are now connected to the internet, all collecting and sharing data. Thanks to the arrival of super-cheap computer chips and the ubiquity of wireless networks, it's possible to turn anything, from something as small as a pill to something as big as an aeroplane, into a part of the IoT.

83. (c) Adjusting to environmental challenges and facing environmental hazards are skills people learn naturally with experience over generations. However, they need to be taught to be proactive and minimise risks. So, environmental education promotes critical thinking about emerging issues, increase public awareness and knowledge of environmental issues; and enhances problem-solving and decision-making skills in respect of handling environmental issues.

84. (b) Primary air pollutants are formed and emitted directly from particular sources. Examples are particulates, carbon monoxide, nitrogen oxide, and sulfur oxide. Secondary air pollutants: Pollutants that are formed in the lower atmosphere by chemical reactions. Examples of a secondary pollutant include ozone, which is formed when hydrocarbons (HC) and nitrogen oxides (NOx) combine in the presence of sunlight; NO_2, which is formed as NO combines with oxygen in the air; and acid rain, which is formed when sulphur dioxide or nitrogen oxides react with water.

85. (b)

Country	**2018 CO2 Emissions in Billion Metric Tons**	**Global Share**	**Change Since Kyoto Protocol**
China	9.43	27.8%	54.6%
U.S.	5.15	15.2%	–12.1%
India	2.48	7.3%	105.8%
Russia	1.55	4.6%	5.7%
Japan	1.15	3.4%	–10.1%
Germany	0.37	2.1%	–11.7%
South Korea	0.70	2.1%	34.1%
Iran	0.66	1.9%	57.7%
Saudi Arabia	0.57	1.7%	59.9%
Canada	0.55	1.6%	1.6%

86. (d) The polluted locations in a continuous sequence are defined as polluted river stretches and categorised in five priority classes based on BOD concentration exceeding to BOD levels >30 mg/l, BOD between 20&30 mg/l, BOD between 10&20mg/l, BOD between 6-10 mg/l and BOD between 3& 6 mg/l. The assessment of water quality for identification of Polluted River Stretches has found that there are 31 States and Union Territories having rivers and streams not meeting water quality criteria in India. The river system both produces and consumes oxygen. The river gains oxygen from the atmosphere through the aerating action of wind or turbulence (cascading water) and from plants through photosynthesis.

87. (a) The Montreal Protocol on Substances that Deplete the Ozone Layer is the landmark multilateral environmental agreement that regulates the production and consumption of nearly 100 man-made chemicals referred to as ozone depleting substances (ODS). When released to the atmosphere, those chemicals damage the stratospheric ozone layer, Earth's protective shield that protects humans and the environment from harmful levels of ultraviolet radiation from the sun. Adopted on 15 September 1987, the Protocol is to date the only UN treaty ever that has been ratified every country on Earth - all 198 UN Member States.

88. (a) Widespread use of fossil fuels in our daily life has led us to an era of global warming and ozone layer depletion. Fossil fuels such as gasoline, diesel, natural gas, etc., when used, emit harmful greenhouse gasses such as CO, CO2, SO2, NOx, etc. After carbon dioxide and methane, nitrous oxide (N2O) is the most potent greenhouse gas, trapping heat and contributing to global warming. It also destroys stratospheric ozone, which protects the planet from harmful ultraviolet rays.

89. (c) CPCB has laid down the permissible noise level in India for different areas. In industrial areas, the permissible limit is 75 dB for daytime and 70 dB at night. In commercial areas, it is 65 dB and 55 dB while in residential areas it is 55 dB and 45 dB during daytime and night respectively. Additionally, there is a category called 'silent zone' which includes areas that lie within 100 meters of the premises of schools, colleges, hospitals and courts. The permissible noise limit in this zone is 50 dB during the day and 40 dB during the night.

90. (c) ROM stores the startup instructions for the computer. It also holds these instructions even after the computer is switched off. Hence, it is permanent memory. These instructions cannot be overwritten but can only be read.

91. (a) In a solar still, impure water is contained outside the collector, where it is evaporated by sunlight shining through clear plastic or glass. The pure water vapour condenses on the cool inside surface and drips down, where it is collected and removed. The end result is pure distilled drinking water.

92. (b) China has a installed capacity of 221 GW and is the leader in wind energy, with over a third of the world's capacity. It has the world's largest onshore wind farm with a capacity of 7,965 megawatt (MW), which is five times larger than its nearest rival. The US comes second with 96.4 GW of installed capacity.

93. (b) Small scale hydropower plants are less damaging to the environment as compare to large scale hydropower plants, but its capital intensive.

94. (c) The 8 Millennium Development Goals
Eradicate extreme poverty and hunger.
Achieve universal primary education.
Promote gender equality and empower women.
Reduce child mortality.
Improve maternal health.
Combat HIV/AIDS, malaria, and other diseases.
Ensure environmental sustainability.
Develop a global partnership for development.

95. (a) The renowned archaeologist Sir Alexander Cunningham rediscovered the ruins of Taxila in the mid-19th century. In 1980, Taxila was declared a UNESCO World Heritage Site.

96. (c) Gross Enrolment Ratio (GER) measures enrolment as percentage of a specific age-group of the population. The Higher Education GER (18-23 age group) in India for the year 2018-19 is 26.3. This is an increase over the previous year and is in line with the increasing trend over the years.

97. (b) Moodle stands for Modular Object-Oriented Dynamic Learning Environment. Founded and developed by Martin Dougiamas in 2002, Moodle was designed to provide educators, administrators, and learners with an open, robust, secure and free platform to create and deliver personalized learning environments.

98. (b) Value-education is not a course subject like others; it is rather an educational programme that aims to inculcate positive moral values in school students by helping them learn by observing good conduct of grown-ups in school, home and other social and religious organisations (C). It seeks to help children assess the effectiveness of moral values for their own and others' good; and cognize how one's own actions get one rewards or punishments (B); and to discover their own fair side and make it their explicit personality (D).

99. (d) RUSA is a Centrally Sponsored Scheme (C.S.S.), launched in 2013 aims at providing strategic funding to eligible state Higher Educational Institutions. The Central Funding (in the ratio of 65:35 for General Category States and 90:10 for Special Category States) would be norm based and outcome dependent. The Funding would flow from the Central Ministry through the State Governments/ Union Territories to the State Higher Education Councils before reaching the identified Institutions. The Funding to States would be made on the basis of critical appraisal of State Higher Education Plans, which would describe each State's strategy to address issues of equity, access and excellence in Higher Education.

100. (d) Rashtriya Uchchatar Shiksha Abhiyan (RUSA) is a Centrally Sponsored Scheme (CSS), launched in 2013 aims at providing strategic funding to eligible state higher educational institutions.

CHAPTER 1

Teaching

SOME DEFINITIONS OF TEACHING

G. Wells	Teaching is cluster of activities that are noted about teachers such as explaining, deducing, questioning, motivating, taking attendance, keeping record of works, students' progress and students' background information.
N.L. Gage	Teaching is a form of interpersonal influence aimed at changing the behaviour potential of another person
Flanders	Teaching is a transactional activity between the teacher and taught, teaching behavior by its very nature exists in the context of social interaction. The acts of teaching leads to reciprocal contacts between the teacher and the learners and the interchange itself called teaching.
B.O. Smith	Teaching is a system of actions involving an agent, an end in view, and a situation including two sets of factors—those over which the agent has no control (class size, size of classroom, physical characteristics of pupils, etc.) and those that he can modify (way of asking questions about instruction and ways of structuring information or ideas gleaned)
Edmund Amidon	Teaching is defined as an interactive process, primarily involving classroom talk which takes place between teachers and pupils and occurs during certain definable activities.
Shri Aurobindo	The first principle of true teaching is that nothing can be taught.
B. F. Skinner	Teaching is 'the arrangement of contingencies of reinforcement'.
Thomas F. Green	Teaching is the task of a teacher which is performed for the development of a child.
Morse and Wingo	The teaching is "understanding and guiding of children as individual and as groups. It means the providing of learning experiences that will enable each learner to grow continuously and sequentially towards his delt role in society"
H.C. Morrison	Teaching is an intimate contact between a more mature personality and a less mature one which is designed to further the education of the latter.
John Brubacher	Teaching is an arrangement and manipulation of a situation in which there are gaps and obstructions which an individual will seek to overcome and from which he will learn in the course of doing so.
Joyce and Weil	Teaching is a process by which teacher and students create a shared environment including sets of values and beliefs which in turn colour their view of reality.
Clarke	Teaching refers to activities that are designed and performed to produce change in student behavior.
Haugh and Duncan	Teaching is a complex process which includes four phases - (i) curriculum planning phase, (ii) an instructing phase, (iii) a measuring phase, and (iv) an evaluative phase. For curriculum planning phase teacher should know the goals of education and the specific objectives to achieve those goals should be formulated. Second phase "instructing" involves the creating, using and modifying instructional strategies, which help the students to learn. Measuring, the third phase of the teaching process deals with the ability to develop measuring devices, organize and analyze the results. Evaluation of teaching outcome requires the help of data obtained from measuring devices. This evaluation is very much in terms of judgment about instructional objectives and subject matter.
Lawrence	Teaching is a complex process to be studied entirely in a "live" situation. In other words teaching is a series of events where teacher attempts to change the behavior of the students along the intended direction. In the process of teaching teacher and student act as two poles interacting with each other through the path of curriculum to achieve the predetermined objectives i.e. to promote the learning of students
Flanders	Teaching is a "reciprocal contact" between student and teacher.

Ronald T. Hyman	Teaching involves a triad of elements (the teacher, the learner, the subject matter) and this triad is dynamic in quality. He rightly asserts that the nature of teaching cannot understand properly by looking at only one or two of the elements of the teaching relationships or by thinking of teaching as dyadic. Thus all the three elements must be considered together in order to understand the interaction recurring during teaching. In this frame of reference, a teacher needs not only to be aware of his aim of teaching but also of his relationship with his learners and the subject matter and the learner's relationship with the subject matter. Also it prevents the teacher from trying to teach the 'syllabus' as handed out by department as it constitutes a static and not a dynamic relationship between teacher and subject matter.

CONCEPT OF TEACHING

Teaching learning is a communication between two or more persons who influence each other by their ideas and learn something in the process of interaction. It is a process in which the learner, teacher, curriculum and other related variables are organized in a systematic way to attain some pre-determined goal. Teaching can be analysed in terms of teacher behaviour at at three levels, namely, component teaching skills, general teaching behaviours and specific teaching behaviours.

OBJECTIVES OF TEACHING

The general objectives of teaching are:

1. To develop all round personality of the learner through the curriculum.
2. To shape the behaviour of the learner in a desired direction.
3. To help the student to adjust and live harmoniously in the new situation environment.
4. To encourage the student to learn and think for themselves to solve the problems.
5. To acquaint the student with the content of the subject to be taught.

The specific objectives of teaching are as follows:

- To Develop Critical and Logical Thinking
- To Creat Interest in the Study
- To Develop Understanding
- To Develop of Knowledge

Role of a Teacher

- Facilitating students in their efforts to learn without directly instructing them on any new concepts.
- Being sensitive to the previous experiences of each and every student in the class.
- Providing authentic (real-world and contextual) tasks.
- Providing as many materials and experiences from the immediate environment as possible. Manipulating materials and events so that the students can gather more experience.
- Providing real-world, context-based learning environments rather than predetermined instructional sequences for making learning more realistic, relevant and contextual.
- Focussing on realistic approaches to solve real-world problems.
- Providing or/and encouraging the students to come out with multiple representations or alternative solutions when engaged in solving a problem.
- Allowing students to ask questions and encouraging them to raise intelligent questions.
- Fostering reflective practice. By encouraging raising intelligent questions, indirectly put pressure to think reflectively.
- Supporting cooperative and collaborative learning in the classroom.
- Connecting the activities in the school with those outside the school.
- Encouraging self-analysis and self-assessment of students' learning progress.

THREE LEVELS OF TEACHING

There are three identifiable levels of teaching and learning activities: Memory level, Understanding level and Reflective level.

Memory Level	• Memory level of teaching means committing factual information to memory. • Memory level teaching or learning is the **least thoughtful.** • Recall, recognition and retention are specially emphasized in this form of teaching or learning.
Understanding Level	• It is reached when thorough understanding of the subject matter is gained through planned learning. • It involves exploration, presentation, assimilation, organization and recitation through oral presentation or in the form of a written paper.
Reflective level	• It consists of two phases: 1. Problem raising and 2. Problem solving. • Teaching-learning at reflective level involves careful and critical examination of an idea or problem through the 'problem solving approach'.

Teaching can be Direct or Indirect

- As the teachers use such methods as lecture, demonstration, etc and engages students in face – to – face interaction, they are teaching them directly.
- Conversely, when they use active methods like role-play, project, assignment, inquiry or other such activities, they are teaching them indirectly.

Teaching can be Vertical or Horizontal

- Depending on the objectives of teaching, teachers may lead students deep into the topic.

- This type of teaching is known as vertical teaching.
- Conversely, if the teachers teach one topic and then move on to more and more topics, they are resorting to horizontal teaching.

Teaching may be Planned or Unplanned

- Traditionally, teachers plan for instruction before they go to the classroom for teaching.
- However, with the coming of active leaning methods, no strict planning is possible as one is not clear in advance what could be the possible way of organizing teaching learning activities.

Components of Teaching

Teacher	Teacher plays a vital and important role of planning, organizing leading and controlling the teaching in order to provide full learning facilities to the students.
Students	Students are dependent upon the teachers for the learning strategies and the content chosen by the teacher. Pupils are there to act according to the planning and organization of teacher to maximize learning.
The Curriculum	The curriculum is a medium of interaction between the students and teachers. So it is a intervening variable to facilitate learning. There are methods, teaching strategies or techniques of teaching through which various interactions between students and teachers take place.

Techniques for Better Classroom Discipline

1. Focusing
2. Direct Instruction
3. Monitoring
4. Modeling
5. Non-Verbal Cuing
6. Environmental Control
7. Low-Prof96ile Intervention
8. Assertive Discipline
9. Consistenely
10. Rule alvoidance

Qualities of Effective Teachers

1. Role of Caring
2. Listening
3. Understanding
4. Knowing Students
5. Role of Fairness and Respect
6. Social Interactions with Students
7. Promotion of Enthusiasm and Motivation for Learning

EXERCISE

1. The main aim of teaching is : **[December-2004]**
(a) To develop only reasoning
(b) To develop only thinking
(c) Both (a) and (b)
(d) To give information

2. Which one of the following is not included in the process of teaching? **[June-2005]**
(a) Instruction (b) Stipulation
(c) Training (d) Change in values

3. In order to understand its student a lecture should have which of the following? **[June-2005]**
(a) Child Psychology
(b) Indication towards understanding the children
(c) Opinion of the studentrtf4s towards the subject matter
(d) All of the choices

4. The practical process of imparting education is: **[June-2005]**
(a) very credible, authentic and regular
(b) not flexible
(c) credible but not regular
(d) None of the above

5. The main objective of teaching at Higher Education Level is: **[December-2006]**
(a) To prepare students to pass examination
(b) To develop the capacity to take decisions
(c) To give new information
(d) To motivate students to ask questions during lecture

6. Which of the two given options is of the level of understanding? **[June-2006]**
(I) Define noun.
(II) Define noun in your own words.
(a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

7. According to Swami Vivekananda, teacher's success depends on: **[December-2008]**
(a) His renunciation of personal gain and service to others
(b) His professional training and creativity
(c) His concentration on his work and duties with a spirit of obedience to God
(d) His mastery on the subject and capacity in controlling the students

8. The teacher has been glorified by the phrase "Friend, philosopher and guide" because: **[June-2008]**
(a) He has to play all vital roles in the context of society
(b) He transmits the high value of humanity to students
(c) He is the great reformer of the society
(d) He is a great patriot

9. Those teachers are popular among students who **[June-2011]**
(a) develop intimacy with them
(b) help them solve their problems
(c) award good grades
(d) take classes on extra tuition fee

10. For maintaining an effective discipline in the class, the teacher should **[June-2011]**
(a) Allow students to do what they like.
(b) Deal with the students strictly.
(c) Give the students some problem to solve.
(d) Deal with them politely and firmly.

11. Dynamic approach to teaching means **[June-2012]**
(a) Teaching should be forceful and effective.
(b) Teachers should be energetic and dynamic.
(c) The topics of teaching should not be static, but dynamic.
(d) The students should be required to learn through activities.

12. If you get an opportunity to teach a visually challenged student along with normal students, what type of treatment would you like to give him in the class ? **[June-2012]**
(a) Not giving extra attention because majority may suffer.
(b) Take care of him sympathetically in the class- room.
(c) You will think that blindness is his destiny and hence you cannot do anything.
(d) Arrange a seat in the front row and try to teach at a pace convenient to him.

13. Arrange the following teaching process in order : **[December-2013]**
(i) Relate the present knowledge with previous one
(ii) Evaluation
(iii) Reteaching
(iv) Formulating instructional objectives
(v) Presentation of instructional materials
(a) (i), (ii), (iii), (iv), (v) (b) (ii), (i), (iii), (iv), (v)
(c) (v), (iv), (iii), (i), (ii) (d) (iv), (i), (v), (ii), (iii)

14. Which of the following is not a prescribed level of teaching? **[December-2014]**
(a) Memory (b) Understanding
(c) Reflective (d) Differentiation

15. Attitude of the teacher that affects teaching pertains to **[December-2014]**
(a) Affective domain (b) Cognitive domain
(c) Connative domain (d) Psychomotor domain

16. Which of the following is the highest level of cognitive ability? **[June-2015]**
(a) Knowing (b) Understanding
(c) Analysing (d) Evaluating

17. Which of the following set of statements reflects the basic characteristics of teaching? **[August-2016]**
Select the correct alternative from the codes :
(i) Teaching is the same as training.
(ii) There is no difference between instruction and conditioning when we teach.
(iii) Teaching is related to learning.
(iv) Teaching is a 'task' word while learning is an 'achievement' word.
(v) Teaching means giving information.
(vi) One may teach without learning taking place.
Codes :
(a) (i), (ii) and (iii) (b) (iii), (iv) and (vi)
(c) (ii), (iii) and (v) (d) (i), (iv) and (vi)

18. Which of the following set of statements best represents the nature and objective of teaching and learning ? **[November-2017]**
(A) Teaching is like selling and learning is like buying.
(B) Teaching is a social act while learning is a personal act.
(C) Teaching implies learning whereas learning does not imply teaching.
(D) Teaching is a kind of delivery of knowledge while learning is like receiving it.
(E) Teaching is an interaction and is triadic in nature whereas learning is an active engagement in a subject domain.
Codes:
(a) (A), (D) and (E) (b) (B), (C) and (E)
(c) (A), (B) and (C) (d) (A), (B) and (D)

19. Which one of the following is a key behaviour in effective teaching ? **[November-2017]**
(a) Using student ideas and contribution
(b) Structuring
(c) Instructional variety
(d) Questioning

20. **Assertion (a) :** All teaching implies learning.
Reason (R) : Learning to be useful must be derived from teaching. Choose the correct answer from the following : **[November-2017]**
(a) Both (A) and (R) are true and (R) is the correct explanation of (a).
(b) Both (A) and (R) are true but (R) is not the correct explanation of (a).
(c) (A) is true, but (R) is false.
(d) (A) is false, but (R) is true.

21. Which one of the following is incorrectly matched between the proponent and the theory of education advocated by him? **[December-2018]**
(a) Plato - Naturalism (b) Dewey - Pragmatism
(c) Plato - Idealism (d) Rossean - Naturalism

22. Which of the following set of statements best describes the nature and objectives of teaching? **[July-2018]**
Indicate your answer by selecting from the code.
(A) Teaching and learning are integrally related.
(B) There is no difference between teaching and training.
(C) Concern of all teaching is to ensure some kind of transformation in students.
(D) All good teaching is formal in nature.
(E) A teacher is a senior person.
(F) Teaching is a social act whereas learning is a personal act.
Code:
(a) (A), (B) and (D) (b) (B), (C) and (E)
(c) (A), (C) and (F) (d) (D), (E) and (F)

23. **Assertion (A) :** All teaching should aim at ensuring learning. **[July-2018]**

Reason (R) : All learning results from teaching. Choose the correct answer from the following **code :**

(a) Both (A) and (R) are true, and (R) is the correct explanation of (A).

(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

(c) (A) is true, but (R) is false.

(d) (A) is false, but (R) is true.

24. A college level assistant professor has planned his/her lectures with an intent to develop cognitive dimensions of students centered on skills of analysis and synthesis. Below, given are two sets of items Set-I consisting of levels of cognitive interchange and Set-II comprising basic requirements for promoting them. Match the two sets and indicate your answer by choosing the correct alternative from the code: **[July-2018]**

Set-I (Levels of Cognitive Interchange)

A. Memory level

B. Understanding level

C. Reflective level

Set-II (Basic requirements for promoting cognitive Interchange)

i. Giving opportunity for discriminating examples and non-examples of a point.

ii. Recording the important points made during the presentations.

iii. Asking the students to discuss various items of information.

iv. Critically analyzing the points to be made and discussed.

Codes:

	A	B	C		A	B	C
(a)	ii	iv	i	(b)	iii	iv	ii
(c)	ii	i	iv	(d)	i	ii	iii

25. Education is a powerful instrument of: **[July-2018]**

(a) Social transformation (b) Personal transformation

(c) Cultural transformation (d) All the above

26. 'Cone of Experience' related to teaching-learning was suggested by: **[20th June 2019-Ist Shift]**

(a) John Dewey (b) Kilpatrick

(c) Froebel (d) Edgar Dale

27. In the two sets given below, Set-I provides the different levels of learning according to Bloom's Taxonomy, while set-II gives their examples and concerns. Match the two sets and select from the options to indicate your answer: **[21st June 2019-Ist Shift]**

Set-I (Levels of Learning)	Set-II (Examples)
(A) Memory level	(i) Identifying examples of a given concept
(B) Understanding level	(ii) Generating new ideas
(C) Analysing level	(iii) Recalling information
(D) Creating level	(iv) Isolating information into parts

	(A)	(B)	(C)	(D)
(a)	(ii)	(i)	(iii)	(iv)
(b)	(i)	(ii)	(iii)	(iv)
(c)	(iv)	(iii)	(i)	(ii)
(d)	(iii)	(i)	(iv)	(ii)

28. A teacher gives lot of positive and negative examples to support his/her presentations in the classroom. This will be related to which level of teaching? [21st **June 2019-IInd Shift]**

(a) Autonomous development level

(b) Memory level

(c) Understanding level

(d) Reflective level

29. Which of the following statements explains the concepts of inclusive teaching? **[24th June 2019-Ist Shift]**

(a) Teacher facilitates the learning of the gifted students.

(b) Teacher facilitates the learning of the weak students.

(c) Teacher takes support of parents of the students to make them learn.

(d) Teacher makes the students of different backgrounds to learn together in the same class.

30. Which among the following bases can be counted to judge the effectiveness of teaching? **[25th June 2019-Ist Shift]**

(1) Marks obtained by students in overall subjects

(2) Level of realization of instructional objectives

(3) Time taken by the students to learn

(4) Resources used by the teacher in teaching

(5) Regularity of students in class

Select your answer from the options given below:

(a) (1), (2) and (3) (b) (1), (2) and (4)

(c) (3), (4) and (5) (d) (2), (3) and (4)

31. Which of the following statements best explains the concept of team teaching? **[25th June 2019-Ist Shift]**

(a) More than two teachers teach

(b) More than two teachers plan and teach together the same class

(c) More than two teachers plan and teach the same class as per their expertise

(d) A team of teachers who are ready and available to teach the students

32. Learning objectives mean **[25th June 2019-IInd Shift]**

(a) Learning experience

(b) Concise outcomes

(c) Academic achievement

(d) Intended learning outcomes

33. Reflective Practice implies use of one's: **[24th June 2019-IInd Shift]**

(a) Cognition

(b) Metacognition

(c) Metacognition on cognition

(d) Reinforcement of learning

34. From the list of the effective teaching behaviours, identify those which are called key behaviours. **[24th June 2019-Ist Shift]**

(i) Direct, audible and oral delivery to all students.

(ii) Encouraging students to elaborate on an answer.

(iii) Warm and nurturing relationship with learners.

(iv) Varying modes of presentation.

(v) Preventing misbehaviour with a minimum of class disruption.

(vi) Organising what is to come and summarising what has gone before.

Select your answer from the options given below:

(a) (i), (iv) and (v) (b) (i), (ii) and (iii)

(c) (ii), (iii) and (iv) (d) (iv), (v) and (vi)

35. Inclusive education implies: **[24th June 2019-IInd Shift]**
(a) Ensuring learning outcome of every child to be the same.
(b) Including the disabled in the main stream
(c) Provides compulsory education for children below 14 years
(d) Ensuring that no child is left behind in education

36. Student-Centric Classroom is meant for **[26th June 2019-IInd Shift]**
(a) Addressing the individual differences
(b) Reducing teacher-oriented lectures
(c) Recalling the previous knowledge
(d) Engaging the entire class

37. In the two sets given below, Set I provides levels of teaching while Set II gives their focus of concern: **[2nd Dec. 2019-IInd Shift]**

Set I	Set II
(Levels of Teaching)	**(Focus of concern)**
(A) Autonomous development level	(i) Problem raising and problem solving
(B) Memory level	(ii) Affects and feelings
(C) Understanding level	(iii) Recall of facts and information.
(D) Reflective level	(iv) Seeing of relationship among facts and their examples
	(v) Peer learning

Select correct answer from the options given below:
(a) (A)-(i), (B)-(ii), (C)-(iv), (D)-(v)
(b) (A)-(i), (B)-(iv), (C)-(iii), (D)-(ii)
(c) (A)-(ii), (B)-(iii), (C)-(iv), (D)-(i)
(d) (A)-(v), (B)-(iv), (C)-(iii), (D)-(ii)

38. In which level of teaching, lower level learning outcomes get focussed? **[3rd Dec. 2019-Ist Shift]**
(a) Memory level
(b) Understanding level
(c) Reflective level
(d) Autonomous development level

39. Which of the following is a key to effective teaching behaviour? **[3rd Dec. 2019-IInd Shift]**
(a) Teacher mediated dialogue which helps learners restructure what is being learned
(b) Elicting clarification of an answer given by students
(c) Soliciting additional information about a response of students
(d) Promoting low error rate (high success) contributive to increased levels of students' self esteem and positive attitude

40. Which of the following statements differentiate teaching from learning? **[4th Dec. 2019-Ist Shift]**
(A) Teaching is a social act while learning is a personal act
(B) Teaching implies learning
(C) Teaching is like selling while learning is like buying
(D) Teaching can occur without learning taking place
(E) In teaching, influence is directed towards learning and learner, while in learning it is usually towards oneself
Choose the correct answer from the following options:
(a) (A), (C) and (E) (b) (A), (B) and (C)
(c) (B), (C) and (D) (d) (C), (D) and (E)

41. Which among the following is **NOT** a component of effective teaching? **[4th Dec. 2019-IInd Shift]**
(a) Questioning to check for the understanding of students
(b) Providing students with feedback
(c) Being flexible about how long it takes to learn
(d) Reactive mode of student's behaviour

42. The basic requirements for organizing teaching at reflective level deal with **[2nd Dec. 2019-Ist Shift]**
(a) Systematic and sequential presentation of facts and information by the teacher
(b) Helping explore and explain problems and their solutions by students
(c) Translating and interpreting the facts by the students
(d) Giving concrete facts and action sequences by the teacher

43. For encouraging 'learning to learn', the emphasis on which of the following would be most appropriate? **[3rd Dec. 2019-IInd Shift]**
(a) Use of educational technology gadgets
(b) Organizing teaching to increase opportunity for transfer of learning
(c) Assigning tasks to be mastered by students
(d) Frequent tests to be conduted

44. The emphasis in memory level teaching is on which of the following? **[6th Dec. 2019-Ist Shift]**
A. Organisation of thoughts and ideas
B. Seeing of relationships among facts
C. Systematic presentations to enable quick reproduction
D. Critical thinking
E. Mastery of concept sequencing of facts
F. Segregating one feature from another
Choose the answer from the following options:
(a) (A), (B) and (C) (b) (A), (C) and (E)
(c) (B), (C) and (D) (d) (D), (E) and (F)

HINTS & EXPLANATION

1. (c) Both (A) and (B)
The main aim of teaching is to 'ignite the minds' of learners so that they become curious seekers of knowledge; and, learn to think and reason with facts and experiences to know.

2. (a) The 'process of teaching' here refers to the process of the making of a teacher.
A prospective teacher has to conform to the **stipulations** of the governing bodies such as NCTE, UGC, NCERT; undergo **training** in all the aspects/skills of teaching; and experience **change in values** to ensure optimal instructional outcomes while teaching.

Instruction is the transfer of learning from one person to another and is undertaken by the teacher in the classroom.

3. (d) Child psychology is the study of the subconscious and conscious working of a developing child's mind, including their emotions, relations and interaction with others. It helps in communicating and connecting with them, and in teaching them coping mechanisms for managing emotions so that they may thrive in each new developmental stage. So, a lecture should keep child psychology in mind; should indicate that it aims at students' understanding; and, should take into consideration the students' opinion towards the subject matter(whether it is difficult, interesting, etc.)

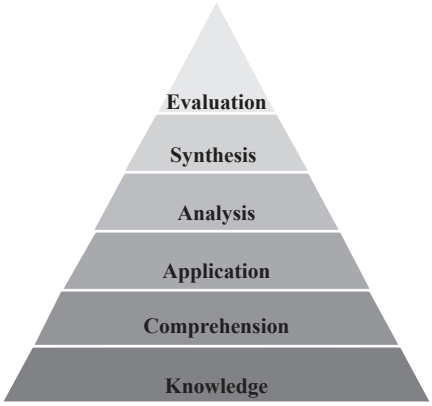
4. (a) The practical process of imparting education is done on a regular basis in a pre-scheduled time frame that covers objective-based instruction in each subject authentically planned and carried out by qualified and trained professionals; and followed by evaluation to check the achievement of those objectives. The consistency of the process in meeting its objectives lends credibility to it. With a wide variety of methodologies to choose from, the process allows enough flexibility to the teachers.

5. (b) As stated in CHAPTER XI: HIGHER EDUCATION: OBJECTIVES AND IMPROVEMENT, of the REPORT OF THE EDUCATION COMMISSION 1964-66, submitted by D.S. Kothari, the functions of the universities in the modern world may be said to be:

- To seek and cultivate new knowledge, to engage vigorously and fearlessly in the spirit of truth and to interpret old knowledge and beliefs in the light of new needs and discoveries.
- To provide the right kind of leadership in all walks of life, to identify gifted youth and help them develop their potential to the full by cultivating physical fitness, right interests, attitudes and moral and intellectual values.
- To provide society with competent men and women trained in agriculture, arts, medicine, science and technology and various other professions, who will also be cultivated individuals imbued with a sense of social justice.
- To strive to promote equality and social justice and to reduce social and cultural differences through diffusion of knowledge.
- To foster in the teachers and students, and through them in society generally, the attitudes and values needed for developing the 'good life' in individuals and society.

6. (b) Only II

Bloom's taxonomy lists six levels of learning in the cognitive domain:



where **comprehension** means 'to understand the meaning of a problem, and be able to convey in one's own words.' The tasks one is able to perform after comprehension are—give example, classify, describe, discuss, explain, express, identify, indicate, locate, recognize, report, restate, review, select, translate, etc.

7. (a) The Vedanta metaphysics of Vivekananda states

- that every soul is destined to be perfect, and every being, in the end, will attain a state of perfection;
- that within man is all knowledge ... it requires only an awakening, and that much is the work of a teacher;
- that the teacher should have an attitude of service and worship.

8. (b) The vital roles one is expected to play in society are not restricted to those of a friend, philosopher and guide only; several other roles are vital too. The teacher is ideally a reformer in the classroom, moulding students into individuals who are capable of reforming the society. He plays a friend, philosopher and guide to his students transmitting high value of humanity to them so that they may transmit the same further to the society at large. Patriotism involves different set of roles and responsibilities not directly related to a teacher's role.

9. (b) As the process of teaching and learning gets underway in the classroom, learners are likely to face problems in understanding or performing activities as desired. Students often face certain problems even outside the classroom. The teacher who is approachable, patient to lend audience and ready to help students gains their respect and love and becomes popular.

10. (d) Instructional outcome of the class might not be obtained by allowing students to do what they like or giving them some problem to solve; and, dealing strictly will hamper students' receptivity and, thereby, their cognition.

11. (d) The students should be required to learn through activities.

"Dynamic", in terms of a process or system, is characterized by constant change, activity, or progress. Dynamic approach to teaching means that the teaching learning process is not static but constantly on the move.

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Since the learning outcomes are measured in terms of students' attainment, it is them rather than the teachers who should be dynamic. This situation is possible only when the students learn through activities.

12. (d) Arrange a seat in the front row and try to teach at a pace convenient to him.

13. (d) (iv), (i), (v), (ii), (iii)

The process of teaching includes the following steps:

(1) Formulation of instructional objectives
(2) Relating the present knowledge with previous one
(3) Presentation of instructional materials (4)Evaluation
(5) Reteaching.

14. (d) Differentiation is a teaching strategy rather than a prescribed level of teaching. It factors students' individual learning styles and levels of readiness first before designing a lesson plan. Research on the effectiveness of differentiation shows this method benefits a wide range of students, from those with learning disabilities to those who are considered of high ability.

The three prescribed levels of teaching are:

Memory level of teaching: Thoughtless teaching wherein emphasis is laid down on the presentation of the facts and information and its cramming.

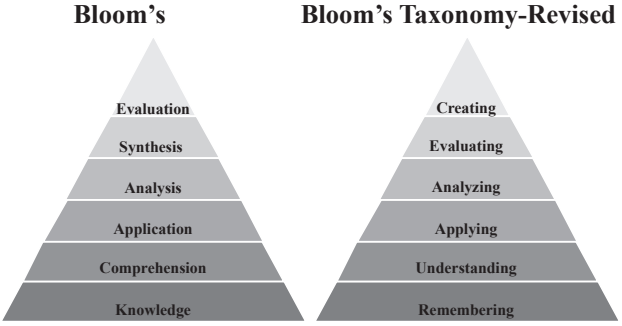
Understanding level of teaching: Thoughtful teaching wherein the teacher strains to make students understand the generalizations, principles and facts.

Reflective level of teaching: Upper thoughtful level of 'problem centered' teaching that includes understanding as well as memory levels. The teacher creates an open environment and throws such a problem before the students that their interest is aroused and they are motivated to swing into action, formulating and testing their hypothesis to solve the problem. The teacher reflects over their teaching practices, analyzing how something was taught and how the practice might be improved or changed for better learning outcomes.

15. (a) A group of researchers led by Benjamin Bloom in 1956 classified educational objectives into three Learning Domains, namely cognitive domain (knowledge), psychomotor domain (skills) and affective domain (attitudes) often called KSA.

Psychology has traditionally identified and studied three components of mind: cognition, affect, and conation. Cognition pertains to grasping the 'what' of information; affect , to 'how I feel' about the knowledge; and, conative, to the connection of knowledge and affect to behaviour and is associated with the issue of "why. Conative domain refers to forms of social communication in which one person tries to influence the mental and emotional state of another. Ironic criticism and empathic praise are prototypical forms of conative theory of mind individual motor abilities (how to play a particular game or run a machine etc.) are modified and developed through training process.

16. (d) Bloom's Taxonomy, created in 1956 under the leadership of educational psychologist Dr Benjamin Bloom in order to promote higher forms of thinking in education, lays down the order of learning domains as under.



17. (b) (i) Teaching is not the same as training. Teaching, as a form of education, is more academic and knowledge based while training is more practical and skills based or job focused.

(ii) There is a clear difference between instruction and conditioning. Instruction is detailed presentation of academic information to students including how something should be done or operated whereas Conditioning is a behavioural process of being able to evoke a desired and predictable response frequently in a given environment by using typical reinforcements of a stimulus or a reward.

(iii) Teaching certainly is related to learning as the two together form a process.

(iv) Teaching is indeed a 'task' to be accomplished while learning is measured in terms of achievable instructional objectives.

(v) Teaching is far more than mere imparting of information. Teachers are facilitators of learning and knowledge acquisition to the learners.

(vi) If teaching is not good, no instructional objectives are met and no learning takes place.

18. (b) Teaching and learning is a process of exchange of knowledge, skills, behaviour and experience. These cannot be considered as objects or goods that can be purchased and sold; or delivered and received. Though teachers are paid to teach and learners pay fees to learn in an institution, the nature and objective of the process of teaching and learning cannot be valued in terms of money. It is indeed invaluable, being instrumental in the evolution of an individual, teacher or taught. The teacher too is a learner. Teaching is social as other(s) is/are involved, while learning is done by every individual for the self, even if done in group. Teaching requires involvement of the triad—teacher, parent, learner while learning is engaging oneself deep in a subject.

19. (c) Employing instructional variety or shifting from one form of instruction to another in presenting a lesson, an instructor manifests his/her flexibility as a teacher. This is done with the objective of maintaining the focus of students which facilitates teaching. This is considered a valuable skill in education and is not easy to master.

20. (c) Teaching is directed at the learner(s); so, it implies that learning happens as a result of teaching. However, learning is not only derived from teaching. Self-learning is often more useful than teaching.

21. (a) Plato—Naturalism

Rousseau's novel Emile or On Education is a treatise on his philosophy of education with the advocacy of

developing the student's character towards upholding naturalism in the face of the unnatural and imperfect environment of the modern society.

John Dewey was a leading proponent of the American school of thought known as pragmatism, a view that rejected the dualistic epistemology and metaphysics of modern philosophy in favour of a naturalistic approach that viewed knowledge as arising from an active adaptation of the human organism to its environment.

In his philosophical theory, Plato advocated an uncompromising idealism which asserted that the experiential world (empirical reality) is fundamentally unreal and the ultimate reality is constitutive of abstract universal essences of things.

22. (c) (A), (C) and (F)

Statement (B) is incorrect as teaching and training are widely different. Statement (D) is negated because informal teaching has shown great results. Statement (E) is incorrect as age is incidental between teachers and taught. Adult literacy schemes involve young teachers and elderly learners.

23. (c) (A) is true, but (R) is false.

All learning does not result from teaching. Self-study is an effective method for a serious learner and one learns much from one's own life experiences. So, R is false.

24. (c) Memory level–Recording the important points made during the presentations.

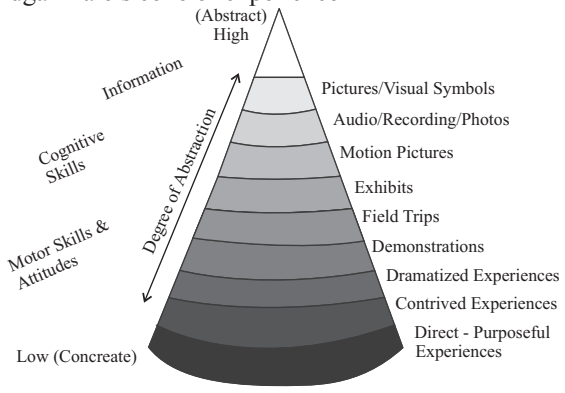
Understanding level–Giving opportunity for discriminating examples and non-examples of a point.

Reflective level Critically analyzing the points to be made and discussed.

25. (d) All the above

Education, following a thoughtfully designed curriculum mainly through classroom teaching, transforms the student as a person, instilling positive traits of social and cultural consciousness in them. Students, in turn, spread this in the society and bring about social and cultural transformation.

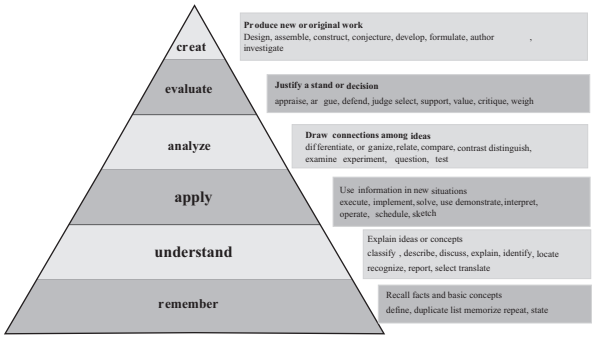
26. (d) Edgar Dale's cone of experience



Graphic courtesy of Edward L. Counts, Jr.

27. (d) Items in set-I and set-II can be matched with reference to Bloom's Taxonomy as shown below.

Bloom's Taxonomy


creat
Produce new or original work
Design, assemble, construct, conjecture, develop, formulate, author , investigate
evaluate
Justify a stand or decision
appraise, ar gue, defend, judge select, support, value, critique, weigh
analyze
Draw connections among ideas
dif ferentiate, or ganize, relate, compare, contrast distinguish, examine experiment, question, test
apply
Use information in new situations
execute, implement, solve, use demonstrate, interpret, operate, schedule, sketch
understand
Explain ideas or concepts
classify , describe, discuss, explain, identify, locate recognize, report, select translate
remember
Recall facts and basic concepts
define, duplicate list memorize repeat, state

28. (c) Examples related to the subject/topic/concept being taught in the class are given to facilitate the **understanding** of the learners.

Inspired by Bloom's Taxonomy, teaching is carried out at three levels, keeping in mind the developmental stage of the learners so that desired educational objectives can be achieved. These three levels are:

Memory level: Least thoughtful teaching

Understanding level: Thoughtful teaching

Reflective level: Upper thoughtful level involving higher cognitive abilities

29. (d) Inclusive teaching refers to the creation of a learning environment which provides all students, regardless of their background, with the opportunity to fulfil their own learning potential and support other students who may wish to learn from them.

30. (d) Teaching is a planned activity which seeks to realise the instructional objectives set out at the beginning using in the process some aids and resources and some tests to evaluate the learning. The level of accomplishment of the objectives is a measure of effectiveness of the teaching exercise and so is the usefulness of the resources used by the teacher as well time taken by students to learn.

Regularity of students is not related to effectiveness of teaching. Marks obtained by students may be a result of other factors.

31. (c) Team teaching consists in a group of instructors collaborating to set goals purposefully for a course, and working regularly and cooperatively to focus on a single class/group of students. They prepare individual lesson plans, but share insights, strategies, methodologies and accountability. It may be single-discipline, interdisciplinary, or school-within-a-school teams that meet with a common set of students over an extended period of time.

32. (d) The process of teaching is carried out with lesson plans wherein certain objectives or learning outcomes are set or stated which should be attained once the lesson has been transacted. The evaluation at the end of the transaction measures whether the learning outcomes were attained or not.

33. (b) Metacognition is a regulatory system that helps one understand and control one's own cognitive performance. It involves awareness of how one learns, an evaluation of one's learning needs, generating strategies to meet those needs and then implementing the strategies.

Reflective Practice is a method of assessing one's own thoughts and actions for the purpose of personal learning and development. So, it involves use of one's metacognition.

34. (a) The key behaviours of a teacher are: lesson clarity (direct audible oral delivery), instructional variety (varying modes of presentation), task orientation (maximizing time spent teaching), engagement in the learning process (preventing students' misbehaviour and minimising class disruption), and student success rate (60-70% of students' time spent on tasks involving complete understanding of lesson).

35. (d) Inclusive education encapsulates ensuring that each individual has an equal opportunity for educational progress; and, all students, regardless of any challenges they may have, are placed in age-appropriate general education classes to receive high-quality instruction, interventions, and supports that enable them to meet success in the core curriculum.

36. (a) In student-centric classroom, there is a high degree of student engagement. The instruction takes cognizance of diversity of students' culture and environment and each student's personal challenge is addressed as the learners get the opportunity to work at their individual pace and explore their personal interests.

37. (c) Refer to answer no. 12 above. The levels of teaching match with their focus of concern as follows:

Set I (Levels of Teaching)	Set II (Focus of concern)
(a) Autonomous development level	(ii) Affects and feelings
(b) Memory level	(iii) Recall of facts and information
(c) Understanding level	(iv) Seeing of relationship among facts and their examples
(d) Reflective level	(i) Problem raising and problem solving

38. (a) Teaching-learning happens at three levels: the lowest is memory level requiring memorising of facts and least level of thinking; next is understanding level, which involves some thinking to draw patterns and associations to get meaning; and the highest is reflective level which involves good amount of thinking and reflection.

39. (a) A teacher mediated dialogue involving all the students of a class encourages students to shed inhibitions; and, freely discuss and interact to restructure what is being learnt. This is the ideal scenario that leads to the attainment of planned objectives and learning outcomes. So, this is key to effective teaching behaviour.

Eliciting clarification of an answer/response or soliciting additional information is likely to demoralise and de-motivate the student. On the other hand, promoting low error rate (high success) may not contribute to increased levels of students' self esteem and positive attitude for below average students.

40. (a) Teaching and learning are differentiated as follows:

- Teaching is a social act as it involves the teacher and the students' interaction in a social environment; while learning is a personal act leading to individual level of attainment of the learner
- Teaching is like selling as the teacher dispenses his/her knowledge and skills in lieu of the salary s/he draws; while learning is like buying knowledge and skills by paying the fees.
- Teaching is an act directed towards learning and learner so influence too is directed on them; while learning is an act aimed at improving/enhancing one's own knowledge and skills.

41. (d) Questioning to check for the understanding of students keeps the teacher in control of the teaching-learning process; providing students with feedback helps them identify their strengths/weaknesses and respectively instils a sense of achievement in them or motivates them to work harder; and being flexible about how long it takes to learn creates a conducive environment for optimal learning. All this amounts to effective teaching.

On the other hand, the teacher's reactive mode to students' behaviour or dynamically tailoring the teaching experience to suit students' behaviour strays the planned process which is not a component of effective teaching.

42. (b) While teaching at memory level is for rote-learning of facts with hardly any thinking involved; and at understanding level, it is for learning with comprehension or understanding; at reflective level, it requires highest level of thinking on the part of both the teacher and the taught. Options (a), (c) and (d) are all fact-learning methods at memory level.

43. (b) (B) Transfer of learning, whether teacher- to- student or student- to -student, is a process which enhances the learning of the learner and consolidates the learning of the teacher (which can be a student teaching another student); and both learn how to learn. So, to encourage 'learning to learn', it is important that teaching is organized in such a manner that the opportunity for transfer of learning is increased.

Using educational technology gadgets; assigning tasks to be mastered by students; conducting frequent tests are routine procedures in education which may not necessarily lead to 'learning' or grasping how one should learn.

44. (b) Teaching at memory level is considered to be the lowest level of teaching, covering only the knowledge-based objectives of Bloom's Taxonomy, that is to impart knowledge and information to the learner. Knowledge or information gained by the learner is factual in nature. It is acquired through memorization or rote learning. At this level, thinking ability does not play any role. Students only identify and cram the facts, information, objects, events, ideas, formulas and laws that are taught to them; and remember/ retain them in memory to recall when needed.

Therefore, only the following of the given statements are emphasised in memory level teaching:

Organisation of thoughts and ideas

Systematic presentations to enable quick reproduction

Mastery of concept /sequencing of facts

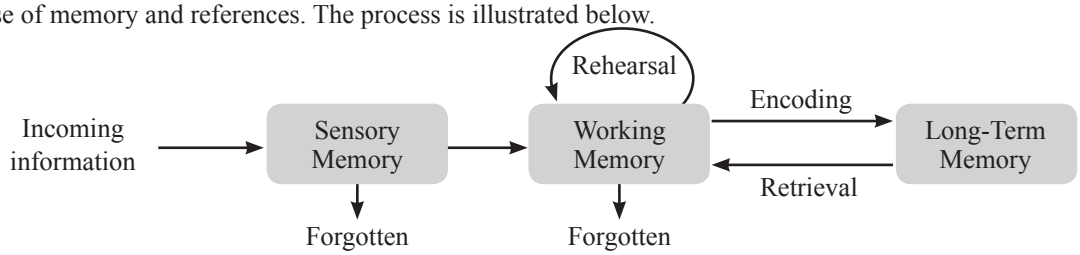
Seeing relationships between facts, critical thinking and segregating one feature from another require thinking skills.

CHAPTER 2

Learner's Characteristics

HOW LEARNING HAPPENS

- Learning happens naturally while we are experiencing the world around us with our senses. Research breakthroughs in medical science have informed us on how the brain functions in the state of learning. Our short-term memory filters and processes those experiences and assigns meaning to the sensory information it receives. Some of that information is transferred to our long-term memory, i.e., the repository of everything we know and have experienced in our lives. When we need that knowledge, we recall it by the use of memory and references. The process is illustrated below.



1. Behaviorism

The learning theory of behaviorism focuses on behaviors that are objectively observable and disregards subjective, independent activities of the mind. Proponents of behaviorism define learning as **conditioning** or acquisition of new behaviour in a given environment and have proved experimentally that conditioning is a universal learning process.

i. **Classic conditioning** theory, also called **Pavlonian** theory after its Russian proponent Ivan Pavlov, pertains to learning through association. It occurs when a natural, biological reflex associated with a particular conditioned stimulus (CS) is triggered in response to an unconditioned stimulus (US).

ii. **Behavioral or operant conditioning** occurs when a response to a stimulus is reinforced.
Operant refers to any behavior that acts on the environment and leads to consequences. Operant conditioning is a simple feedback system working on the theory, that a reward or reinforcement following the response to a stimulus makes its occurrence more probable/likely in the future. This theory is based on B.F. Skinner's philosophy of 'radical behaviorism'.

Criticisms of Behaviorism

i. It does not explain those kinds of learning which involve mindfulness or cognition, since it disregards the activities of the mind.

ii. It does not explain learning of the kind where there is no reinforcement, e.g., the recognition of new language patterns by young children.

iii. Research on animals has shown that reinforced behavior patterns can possibly be adapted to changed/new information. A rat that has previously mastered a behavior pattern to manoeuvre a maze through reinforcements can shift its behavior if the layout of the maze is changed.

2. Cognitivism

The learning theory of cognitivism focuses on inner mental activities that are essential for cognitive development. It is concerned with opening the "black box" of the human mind to determine how processes such as conscious thought, memory, knowing, conversation, decision-making, emotion and problem-solving occur.Developed by Jean Piaget and contributed to by Bloom, Bruner and Ausubel, this theory propounds that people are not "programmed animals" that merely respond to environmental stimuli; they are rational beings whose actions are a consequence of thinking and a learner constructs cognitive pathways to understand and respond physically to experiences. Cognitivism replaced behaviorism in 1960s as the dominant paradigm that gave the metaphor of mind as a computer system where information goes in, gets processed and leads to certain outcomes.

3. Constructivism

Constructivism, propounded by John Dewey, Jean Piaget, Jerome Bruner, Lev Vygotsky, and others, is based on the idea that learning is a constructive process where people actively construct or create their own understanding or subjective representations of objective reality of the world and link what they already know from their past experiences with new information and experiences to construct their own meaning. So, the learner is viewed as information constructor.

4. Humanism

Humanistic theory of learning is majorly based on the work of Abraham Maslow (1908–1970) and Carl Rogers (1902–1987). It views the learner as an individual subject with affective and cognitive needs; and learning as a personal endeavour with 'intentionality and values' (Huitt, 2001) to fulfil one's individual potential, or reach self-actualization through a natural holistic process while growing and developing over the lifespan.

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5. Connectivism

Connectivism is a contemporary learning theory which focuses on 21st Century Skills and gives more autonomy to students in the way they choose to learn. This theory has developed to adapt to the vast digital and technological advancement; and, is based upon the idea that people process information by forming connections and interacting. It suggests that people no longer stop learning after formal education; rather, they continue to increase their knowledge base through technology-enabled access to a huge reservoir of information, experience new themes and acquire new skills.

JOHN CARROLL'S MODEL OF SCHOOL LEARNING

It states:

School learning (f) = Time spent / Time needed

where,

Time spent = **Opportunity** and **Perseverance**

Time needed = **Aptitude, Prerequisite knowledge,** and **Quality of instruction**

Robert Slavin revised John Carroll's model of school learning to produce the **QAIT Model of instruction** in which those elements that were not under the control of educators were eliminated, while those that could be altered or modified by teachers were retained or redefined.

1. **Q**uality of instruction
2. **A**ppropriate levels of instruction (redefinition of Carroll's student characteristic 'ability to understand instruction')
3. **I**ncentive (redefinition of Carroll's student behaviour 'perseverance')
4. **T**ime (equivalent to Carroll's variable **Opportunity**)

LEARNER'S CHARACTERISTICS

Awareness of learner's characteristics helps the teacher/instructor to determine what approach, methods and strategies to use in academic instruction. Learner information can be obtained from surveys, interviews, observations and performance statistics of knowledge and skills.

CHARACTERISTICS OF ADOLESCENT LEARNERS

Learner characteristics can be personal, physical, academic, social, emotional, moral and cognitive in nature. The young adolescent is going through a distinctive phase of physical, emotional, intellectual, moral and social changes simultaneously, with the academic development. All of these changes must be taken into account while directing their learning, and instructional methods and practices must be remodelled accordingly to optimise learning outcomes. It is important to know the exact characteristics manifested by all these changes in adolescents.

Personal Characteristics

These relate to demographic elements such as:

1. Age
2. Gender
3. Level of maturity
4. Language
5. Socio-economic status
6. Cultural background
7. Size and influence of family
8. Specific skills or impairments to learning pertinent to the particular group/community/ fraternity/ nationality they may be constituents of

Physical/Physiological Characteristics

There include:

1. Restlessness and fatigue due to hormonal changes
2. Sudden outbursts of physical activity to release energy because of spurt in energy levels
3. Growing sexual awareness resulting in sensitivity to touch
4. Concern about physical changes and appearance
5. Physical vulnerability and poor health resulting from dietary fads and/or engaging in risky behaviours
6. Awkward, uncoordinated body movements caused by physical changes and consciousness of those

Academic Characteristics

1. Goal and success oriented learning style; fixing learning goals for self
2. Propensity for high achievement when challenged and engaged
3. Preference for active over passive learning experiences
4. Interest in interacting with peers during learning activities
5. Demanding relevance of what is being taught to actual learning
6. Increased capacity for higher levels of humor which may be misunderstood as sarcasm or offence by adults
7. Applying prior knowledge to learning processes

Cognitive Characteristics

Cognitive characteristics of adolescent learners include:

1. Meta-cognition, (awareness and understanding of one's own thought processes)
2. Independent and rational thought
3. Shift from concrete to abstract thinking
4. Intense curiosity and eagerness to learn about a variety of interesting, useful and personally relevant topics, a chosen few of which are sustained over the long term
5. Penchant for exploration and experimentation
6. Ability to be self-reflective
7. Ability to analyse, integrate and evaluate concepts and theories about the relationship between individual and society

Emotional Characteristics

1. Unpredictability because of mood swings marked by peaks of intensity and troughs of despair
2. Overpowering desire to discover independence and individual adult identity; and accepting only specific mediation
3. Deep concern about physical growth and maturity
4. Strong beliefs
5. Holding their personal problems, feelings, and experiences unique
6. Extreme consciousness of self-image and its protection

7. Heightened sensitivity and overreaction to criticism, ridicule, embarrassment, and rejection
8. Tendency to rebel against authority
9. Development of specific/personal interests
10. Motivation to know and learn
11. Defined attitude toward learning and subject matter
12. Anxiety
13. Attribution of success (i.e., locus of control)

Social Characteristics

1. Craving for social acceptance
2. Seeking approval of peers and others with attention-getting behaviours
3. Modelling behaviour and communication after that of older mates and parents/ other adults to a much lesser degree
4. Experimenting with ways of talking and acting as part of searching for a social position with peers
5. Seeking racial and ethnic identity and drawn to peers who share the same background
6. Exploring questions of sexual identity in overt or covert ways
7. Anxious and intimidated by the initial middle school experience
8. Fondness for popular culture and interest in following fads
9. Seeking approval of peers and others with attention-getting behaviors
10. Vacillating between demand for independence and desire for guidance and protection corresponding to the growth of interpersonal skills

Moral Characteristics

1. Understanding of moral issues and questioning of values, cultural expressions, religious teachings, etc.
2. Older adolescents developing awareness of democratic rights and duties and getting interested in the political processes
3. Impatience with the social issues and pace of change, not realizing social change is neither easy nor fast
4. Seeking receptive and trustworthy adult role models and being influenced by them
5. Relying on parents and important adults for moral advice, but holding on to their own opinion
6. Judging others quickly, but hesitant and slow in acknowledging one's own faults
7. Compassionate towards the downtrodden/ suffering and concerned about animals and environmental issues

CHARACTERISTICS OF ADULT LEARNERS

Are Goal-oriented: Adults are look to learning courses/ activities that would help their reach their goals in life.

Apply their wealth of knowledge to the learning situation.

Seek Autonomy: Adult learners prefer autonomy and look for options to choose from.

Prefer Practical Learning by Doing: Adults prefer to be active and learn by doing rather than passively listening to lectures.

Are Purposeful: and want to know the purpose and motive behind any learning activity.

Aim for Attains Competence and Mastery: Adults try to attain competence and mastery in workplace skills to boost their confidence and raise their self-esteem.

Have Big Picture orientation: Have the adult learner is oriented to view the big picture of what they're learning and to understand how the smaller parts fit into it.

Are Result-oriented

Are Responsible for Self

Are Limited by Emotional Barriers

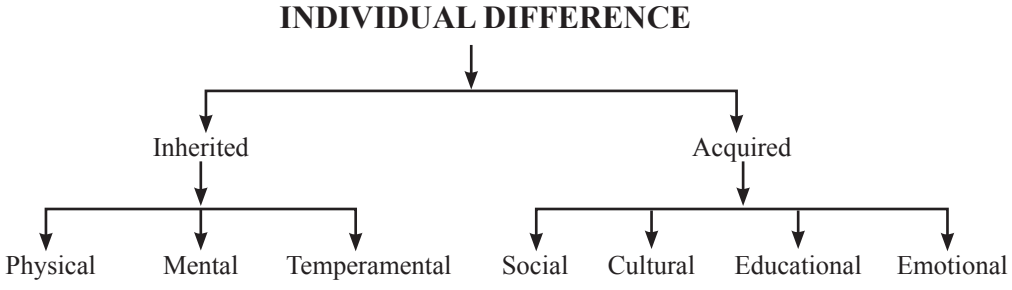
Are Stressed by outside responsibilities

Have Physical limitations due to: Advanced age and/or impaired physical prowess.

Need Community: Self-directed adult learners generally prefer community learning which enables interaction and discussion on questions and issues.

Table of comparison: Adult Vs Adolescent learners

S. No.	Adult learners	Young learners
1.	Problem centred	Subject oriented; focus on course completion
2.	Result oriented	Future oriented
3.	Self-directed	Dependent upon adults for direction
4.	Sceptical about new information	Likely to accept new information
5.	Take responsibility of their own learning	Depend upon others



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12 Major Areas of Individual Differences

1. Physical Differences
2. Differences in Intelligence
4. Differences in Interests
5. Differences in Attitudes
6. Differences in Aptitude
7. Differences in Achievement
8. Emotional Differences
9. Socio-economic Differences
10. Ethno-Cultural Differences
11. Differences on account of gender
12. Personality differences

Major Causes of Individual Differences:

1. Heredity
2. Environment
3. Influence of caste, ethnicity and nation
4. Sex differences
5. Age and intelligence
6. Temperament and emotional quotient
7. Economic condition and education

Educational Implications of Individual Differences

- **Visual (spatial): l**earning with the use of **sense of sight, through** pictures, visuals, images and spatial understanding.
- **Aural (auditory-musical):** learning with the use of **sense of hearing**, through sound and music.
- **Verbal (linguistic):** learning with the use of **words**, in speech as well as writing.
- **Physical (kinesthetic):** learning with the use of **sense of touch**, through one's bodily movements.
- **Logical (mathematical):** learning by applying **logic**, through the mental faculties of analysis, reasoning and systematising.
- **Social (interpersonal):** learning through **interaction and communication** with other individuals or groups.
- **Solitary (intrapersonal):** learning in solitude (state of being alone) through **self-study**.

Measures to Address Individual Differences in the Classroom

1. **Aims and objectives** of education should be linked with individual differences as regards different abilities and traits of learners.

2. **Curriculum** should be so designed hexibly as to cater to the varied interests, abilities and needs of different students.

3. Different **methods of teaching** such as role-playing method, project method, Montessori method, story-telling methods should be adopted considering individual difference related to interests, needs, etc. Various methods such as role playing method, project method, Montessori method, storytelling methods.

4. The choice of **teaching aids** should be such as to attract the range of abilities, interests and needs of the different children.

5. **Limited size of the class:** Compulsory Education (RTE) Act, 2009 lays down the Pupil Teacher Ratio (PTR) at 30:1 for the primary level and 35:1 for upper primary.

6. **Proper division of the class:** taking into account individual differences in age, interests and physical, emotional and social qualities rather than consider only the mental or chronological age of children.

7. **Individualized learning:** Should be promoted by plans.

(i) **Dalton Plan** regards school as 'children house' and allows learners all freedom, co-operation and time they need to learn. There is no time table, no classroom and no interruption as learners get absorbed after choosing the subjects that suit their individual interests. They are allowed to work and learn at their own pace and in accordance with their individual ability.

(ii) **Morrison Plan** follows directed guidance and stresses unit assignment. To suit individual needs and interests

(iii) **Winnetka Plan** first assesses the knowledge level of an individual through an examination and on the basis of that, plans a customised learning unit for them.

(iv) **Contract Plan** has the subjects of study determined like the Dalton method; and the pupil's progress is measured through tests like the Winnetka method.

(v) **Project based learning technique**

The teacher only facilitates the project and provides scaffolding (demonstrates a model of the process/ work/solution and steps back, offering support only when needed).

EXERCISE

1. If in a group of students some weak as well as some intelligent students are included then which of the following practices is considered a better way for imparting education to each of the students? **[June-2005]**

1. Keeping the standard of teaching high so that weak students also work hard to attain the level of intelligent students
2. Keeping the standard of teaching at a low level so that each student of the class may understand the subject matter being explained by the teacher
3. Keeping the standard of teaching at a medium level so that the intelligent students may maintain their interest in attending the classes.
4. Arranging additional classes for the week students

(a) 1 and 4 (b) 2 and 4
(c) 3 and 4 (d) None of the choices

2. The most appropriate purpose of learning is: **[December-2007]**
(a) personal adjustment
(b) modification of behaviour
(c) social and political awareness
(d) preparing oneself for employment

3. The students who keep on asking questions in the class should be: **[December-2007]**
(a) encouraged to find answer independently
(b) advised to meet the teacher after the class
(c) encouraged to continue questioning
(d) advised not to disturb during the lecture

4. Some students in a class exhibit great curiosity for learning. It may be because such children **[December-2010]**
(a) Are gifted
(b) Come from rich families
(c) Show artificial behaviour
(d) Create indiscipline in the class

5. For an efficient and durable learning, learner should have **[December-2012]**
(a) ability to learn only
(b) requisite level of motivation only
(c) opportunities to learn only
(d) desired level of ability and motivation

6. Which one is the highest order of learning ? **[June-2013]**
(a) Chain learning
(b) Problem-solving learning
(c) Stimulus-response learning
(d) Conditioned-reflex learning

7. The most appropriate meaning of learning is **[December-2013]**
(a) Acquisition of skills
(b) Modification of behaviour
(c) Personal adjustment
(d) Inculcation of knowledge

8. Dyslexia is associated with **[June-2014]**
(a) mental disorder (b) behavioural disorder
(c) reading disorder (d) writing disorder

9. Which set of learner characteristics may be considered helpful in designing effective. teaching-learning systems ? Select the correct alternative from the codes given below : **[July-2016]**
(i) Prior experience of learners in respect of the subject.
(ii) Interpersonal relationships of learner's family friends.
(iii) Ability of the learners in respect of the subject,
(iv) Student's language background.
(v) Interest of students in following the prescribed dress code.
(vi) Motivational-orientation of the students.
Codes :
(a) (i), (ii), (iii) and (iv) (b) (i), (iii), (iv) and (vi)
(c) (ii), (iii), (iv) and (v) (d) (iii), (iv), (v) and (vi)

10. Which of the following learner characteristics are likely to influence the effectiveness of teaching aids and evaluation systems to ensure positive results? **[August-2016]**
(a) Learner's family background, age and habitation.
(b) Learner's parentage, socio-economic background and performance in learning of the concerned subject.
(c) Learner's stage of development, social background and personal interests.
(d) Learner's maturity level, academic performance level and motivational dispositions.

11. From the list given below identify the learner characteristics which would facilitate teaching- learning system to become effective. Choose the correct code to indicate your answer. **[November-2017]**
(A) Aptitude of the learner
(B) Learner's stage of development
(C) Learner's religious affiliation
(D) Learner's food habits and hobbies
(E) Prior experience of learner
(F) Learner's family lineage
Codes :
(a) (A), (C) and (D) (b) (D), (E) and (F)
(c) (A), (D) and (E) (d) (B), (C) and (F)

12. Which of the following learner characteristics is highly related to effectiveness of teaching? **[July-2018]**
(a) Prior experience of the learner
(b) Educational status of the parents of the learner
(c) Peer groups of the learner
(d) Family size from which the learner comes.

13. According to Bloom's traditional taxonomy, the highest level of learning in cognitive domain is **[December-2018]**
(a) Evaluation (b) Comprehension
(c) Analysis (d) Application

14. Which of the following is a social characteristic of a learner? **[20th June 2019-Ist Shift]**
(a) Power of sensory perception
(b) Thinking ability
(c) Power of synthetic imagination
(d) Ability to relate oneself with others

15. Which among the following is a non-cognitive characteristic of learner? **[20th June 2019-Ist Shift]**
(a) Recalling
(b) Problem solving
(c) Identifying important sensory inputs
(d) Believing what is true

16 Which of the following is an example of higher order of cognitive learning outcome? **[20th June 2019-IInd Shift]**
(a) Learning of facts and their sequences
(b) Learning roles and action sequences
(c) Learning of concepts and abstractions
(d) Learning of awareness and valuing

17. Below are listed some learners characteristics. Identify those that help in effective teaching. **[21st June 2019-IInd Shift]**
(1) Learner's respect for teacher
(2) Learner's level of mental ability
(3) Learner's previous experiences
(4) Learner's level of interest to study
(5) Learner's level of interpersonal relation
(6) Learner's view about the society
Select your answer from the options given below:
(a) (1), (2), (3) and (6) (b) (3), (4), (5) and (6)
(c) (1), (2), (3) and (4) (d) (2), (3), (4) and (6)

18. Who developed the theory of 'Multiple Intelligence'? **[24th June 2019-Ist Shift]**
(a) Alfred Binet (b) L. Thurstone
(c) Charles Spearman (d) Howard Gardner

19. Which among the following best describes the Emotional Intelligence of learners? **[24th June 2019-Ist Shift]**
(A) Understand the emotion of other people and your own
(B) Express oneself very strongly
(C) Being rational in thinking
(D) Adjusting one's emotion as per situation
(E) Being creative and open to criticism
(F) Accepting other people as they are
Choose your answer from the options given below:
(a) (A), (D) and (F) (b) (D), (E) and (F)
(c) (A), (B) and (C) (d) (D), (C) and (D)

20. As per the cognitive development theory of Jean Piaget, adolescent students are in which stage of development? **[25th June 2019-Ist Shift]**
(a) Sensory motor stage
(b) Concrete operational stage
(c) Operational stage
(d) Formal operational stage

21. Which of the learner characteristics will influence his/her perspective in a course of study? **[26th June 2019-Ist Shift]**
(i) Learner's commitment
(ii) Parents' interest in the learner
(iii) Prior knowledge of the learner
(iv) Skill of the learner in the concerned area
(v) Family size of the learner
(vi) Socio-economic background of the family to which the learner belongs
Choose the correct answer from the options given below:
(a) (i), (iii) and (iv) (b) (i), (ii) and (iii)
(c) (iii), (iv) and (v) (d) (iv), (v) and (vi)

22. In a classroom, content produced for a specific user will lead to: **[20th June 2019-Ist Shift]**
(a) personality development
(b) content filtering
(c) personalisation
(d) general academic integration

23. From the list of learning outcomes indicated below, identify those which are said to be high level outcomes: **[2nd Dec. 2019-IInd Shift]**
(A) Learning of facts and rules
(B) Showing the ability to analyse and synthesize
(C) Awareness, responding and valuing
(D) Imitation, manipulation and precision
(E) Articulation and naturalization
(F) Organization and characterization
Choose correct answer from the options given below:
(a) (B),(E) and (F) (b) (A), (B) and (C)
(c) (B),(C) and (D) (d) (A), (C) and (F)

24. Identify those features of learner behaviour which are associated with understanding level teaching : **[3rd Dec. 2019-IInd Shift]**
(A) The student renders facts and information in his/her own words
(B) The student immediately recalls the facts taught
(C) The student gives his/her own examples in order to explain a point
(D) The student interprets the meanings in various ways
(E) The student correctly reproduces the sequence taught
Select your answer from the following options :
(a) (A), (B) and (C) (b) (B), (C) and (D)
(c) (B), (D) and (E) (d) (A), (C) and (D)

25. Which of the learning outcomes are intended in teaching organized at understanding level? **[4th Dec. 2019-Ist Shift]**
(a) Longer recall and retention of facts
(b) Seeking of relationships and patterns among facts
(c) Creative construction and critical interpretation of ideas
(d) Mastery of facts and information

26. Match correctly the items of column-I with the items of column-II **[5th Dec. 2019-Ist Shift]**

Column-I	Column-II
(A) Dyslexia	(i) Difficulty in doing mathematics
(B) Dysgraphia	(ii) Difficulty in reading
(C) Dyscalculia	(iii) Difficulty in Writing
(D) ADHD	(iv) Difficulty in concentrating

(a) (A)-(i), (B)-(iii), (C)-(iv), (D)-(ii)
(b) (A)-(ii), (B)-(iii), (C)-(i), (D)-(iv)
(c) (A)-(iv), (B)-(i), (C)-(iii), (D)-(ii)
(d) (A)-(i), (B)-(iv), (C)-(ii), (D)-(iii)

27. Match the items given under Column II providing description with the items under Column I indicating the basis. **[5th Dec. 2019-IInd Shift]**

Column I (Basis)	Column II (Description)
(A) Cognitive	(i) Ability to relate to other
(B) Emotional	(ii) Ability to articulate the idea
(C) Social	(iii) Ability to read others 'facial expression'
(D) Verbal	(iv) Ability to solve abstract problem

Choose the correct option from those given below :
(a) (A)-(i), (B)-(iii), (C)-(iv), (D)-(ii)
(b) (A)-(iv), (B)-(iiii), (C)-(i)- (D)-(ii)
(c) (A)-(iv), (B)-(iii), (C)-(ii), (D)-(i)
(d) (A)-(iv), (B)-(i), (C)-(ii), (D)-(iii)

28. Which among the following is least important for the academic success of students? **[5th Dec. 2019-IInd Shift]**
(a) Cognitive competence (b) Emotional competence
(c) Legal competence (d) Social competence

29. The most characteristic feature of an adolescent learner which determines his/her social and moral development is the **[6th Dec. 2019-Ist Shift]**
(a) Tendency to be away from parents
(b) Concern for hero worshipping for emulating values and standards
(c) Mixing up with peers in the neighborhood
(d) Identity crisis

HINTS & EXPLANATION

1. (c) In a class of some intelligent (or above-average) and some weak (or below-average) students, the ideal method is to teach at the average student's level so that the intelligent ones do not lose interest; and, at the same time, the weak do not lag much behind and it is possible to bring them on par with additional classes customised for their need.

2. (b) Learning is a continuous process of acquiring new, or modifying existing, knowledge, behaviours, skills, values, or preferences, either consciously or unconsciously.

Personal adjustment, social and political awareness, and preparing oneself for employment are subsidiary purposes served by learning.

3. (a) Einstein has famously said, "The important thing is not to stop questioning. Curiosity has its own reason for existing."

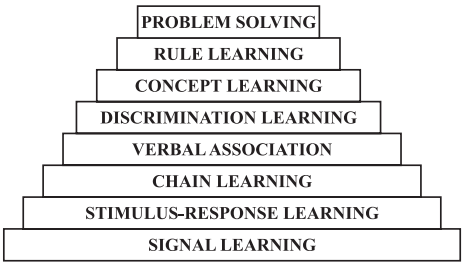
Curiosity fuels the desire to seek answers which is the guiding principle behind all learning, discovery and invention in human landscape. Curiosity holds the learner's interest and makes learning enjoyable and effective. So, students must never be discouraged from questioning. At the same time, they should be encouraged to find answers themselves, rather than to continue questioning with the expectation of receiving readymade answers from the teacher.

4. (a) In a class of average students, it is the teacher's responsibility to create the optimum learning environment where learners are motivated and ready to learn. It is theoretically not expected of the students to be eager to learn until the teacher guides them to the state of learning. So, if some students display great curiosity for learning, it is because they are gifted, having exceptional talent or natural ability to learn.

5. (d) On cannot learn if one doesn't have the ability to grasp concepts. Even when one has the ability proper learning does not take place without the motivation or drive to learn. So, learning is efficient and durable when the desired level of ability as well as motivation is present.

6. (d) Conditioned-reflex learning

A conditioned reflex, also called an acquired reflex, is an automatic response to a stimulus that differs from that initially causing the response, but that has become associated with it by repetition, in a process known as classical conditioning. Such a reflex is developed gradually by training in association with specific repeated external stimuli. This is considered the highest order of learning above the following EIGHT CONDITIONS OF LEARNING HIERARCHY proposed by Robert M Gagne.



7. (b) Modification of behaviour.

"Learning is the relatively permanent change in a person's knowledge or behaviour due to experience...." (From Learning in Encyclopaedia of Educational Research, Richard E. Mayer

8. (c) Dyslexia i8is a common learning disorder involving difficulty in processing words that can cause problems with reading, writing, spelling and speaking despite normal intelligence. It exists in varying degrees in affected individuals.

9. (b) Learner characteristics which will be helpful in designing effective teaching-learning systems are—

- Prior experience of learners in respect of the subject.
- Ability of the learners in respect of the subject.
- Student's language background.
- Motivational–orientation of the students.

10. (d) Effectiveness of teaching aids and evaluation systems to ensure positive results is dependent on the motivation, academic performance level and stage of maturity/ development of the learner. The learner's parentage, family background, socio-economic background, age, habitation, or personal interests are least likely to influence it.

11. (a) Prior experience of learner takes new learning further than a clean slate would. Prior experience enhances the learner's understanding.

Aptitude of the learner as well as the learner's stage of development is directly proportional to the amount or degree of learning done.

12. (a) Prior experience of the learner

The learner's prior experience determines how (s) he builds on the information imparted next because 'known to unknown' linkage facilitates retention and, thus, is highly related to the effectiveness of teaching. As one learns from parents and peers, parents' education and peer groups also influence the level and quality of learning; and, as family size determines the availability of resources, it also plays a role. However, none of these is as highly related to the effectiveness of teaching.

13. (a) Evaluation

Bloom's traditional taxonomy of cognitive domains in ascending order is:

knowledge, comprehension, application, analysis, synthesis, and evaluation

14. (d) The ability to relate oneself with others in the society is a social characteristic. The other given characteristics are related to the mind.

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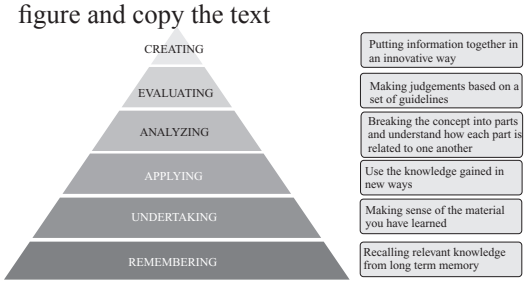
15. (d) Recalling, problem-solving, identifying sensory inputs involve cognition or activation of the mind and the senses.

16. (c) Refer to Bloom's Taxonomy shown below :Create the figure and copy the text


CREATING
EVALUATING
ANALYZING
APPLYING
UNDERTAKING
REMEMBERING
Putting information together in an innovative way
Making judgements based on a set of guidelines
Breaking the concept into parts and understand how each part is related to one another
Use the knowledge gained in new ways
Making sense of the material you have learned
Recalling relevant knowledge from long term memory

Learning of concepts and abstraction involves not only the ability to understand but also, to apply, analyse and evaluate. Learning of facts and their sequences; roles and action sequences; and awareness and valuing; involves the lowest order learning outcome of remembering.

17. (d) A learner's level of mental ability, previous experiences, level of interest to study; and view about the society. The learner's level of interpersonal relation is not significant for effective teaching. Reclusive as well as interactive students benefit from effective teaching. Effective teaching has been observed despite lack of respect for the teacher among senior students.

18. (d) Howard Gardner

19. (a) Emotional intelligence is generally said to include at least three skills: emotional awareness, or the ability to identify and name one's own emotions; the ability to harness those emotions and apply them to tasks like thinking and problem solving; and the ability to manage emotions, which includes both regulating one's own emotions when necessary and helping others to do the same.

So, A,D,F, i.e., understanding the emotions of other people and one's own; adjusting one's emotion as per the situation; and, accepting other people as they are, describe it.

20. (d) Piaget proposed four stages of cognitive development:

1. Sensorimotor stage—birth to age 2
2. Preoperational stage – age 2 to 7
3. Concrete operational stage—age 7 to 11
4. Formal operational stage –age 11 (including adolescence) to adulthood

21. (a) A learner's perspective in a course of study is not influenced by their family size or socio-economic background, or their parents' interest in them. It is the interest and commitment of the learner, and the prior knowledge and specific skill of the learner in the concerned area that influence it.

22. (c) Content produced for a specific user in the classroom is personalised by that user as it does not concern others in the classroom.

Classroom content contributes in personality development only to a negligible degree.

Content filtering is the use of a program to screen and/or exclude access to web pages or email deemed objectionable.

General academic integration is for all students in a classroom rather than a specific student.

23. (a) The three levels of learning in ascending order are: memory, understanding and reflective.

Memory level: only learning of facts without any thinking involved

Understanding level: understanding with some thinking

Reflective level: highest level of thinking involving the ability to analyse and synthesize; articulate and naturalize; organize and characterize, etc.

24. (d) Teaching happens at three levels:

Memory level involves recalling the facts taught (b); and reproducing the sequence taught(e)

Understanding level involves imbibing well so as to be able to present facts and information in ones' own words(a); give one's own examples to explain a point(c); and interpret the meanings in various ways (d);

Reflective level involves deep thinking and reflection so as to be able to identify, definne and solve problems.

25. (b) Teaching can be organized at three levels: memory, understanding, reflective.

Options (a) and (d) indicate the memory level, option (b) understanding level and option (c) reflective level. At memory level, rote learning or longer recall and retention of facts is done with least thinking involved.

26. (b) Dyslexia is a learning disorder that involves difficulty reading due to problems identifying speech sounds and learning how they relate to letters and words (decoding). Dysgraphia is a learning disability that affects writing abilities. Dyscalculia is difficulty in learning or comprehending arithmetic, such as difficulty in understanding numbers, learning how to manipulate numbers, performing mathematical calculations and learning facts in mathematics. ADHD stands for attention deficit hyperactivity disorder. It is a medical condition. A person with ADHD has differences in brain development and brain activity that affect attention, the ability to sit still, and self-control.

27. (b)

(a)	Cognitive	(iv)	Ability to solve abstract problem
(b)	Emotional	(iii)	Ability to read others' facial expression
(c)	Social	(i)	Ability to relate to other
(d)	Verbal	(ii)	Ability to articulate the idea

28. (c) Cognitive competence is an essential requirement to attain academic success. Academic learning happens in a social environment; so, social competence is important; and since emotions are inseparable in social communication, emotional competence too is desirable. However, legal competence is least important, as there is no legal concern involving learners in an academic institution.

29. (b) Hero worshipping is a very prominent characteristic of an adolescent learner. They emulate in every way the role model they choose to look up to; for, everything about the hero appeals to them. As they emulate their role model's social behaviour, actions and preferences, their own social and moral understanding undergoes change, accordingly.

Adolescent learner's characteristics of tendency to be away from parents, mixing up with peers in the neighbourhood or identity crisis are less significant contributors to social moral development.

CHAPTER 3

Factors Affecting Teaching

FACTORS AFFECTING TEACHING

The various factors that come into play whenever a teaching-learning process is underway are related to the following:

1. Teacher
2. Learner
3. Support material
4. Teacher- student relationship
5. Instructional facilities
6. Teacher- administration relationship
7. Learning environment/Classroom environment
8. Institution and administrative policies

1. Teacher

i. Educational Qualification and Subject Knowledge
ii. Awareness of learner factors
iii. Experience of the teacher
iv. Parental expectation
v. Teaching Skills:
vi. Methods of teaching
vii. Friendliness and Approachability
viii. Personality and behaviour:
ix. Level of Adjustment and Mental health of the teacher:
x. Discipline
xi. Economic factor

2. Learner

i. Learner's physical and mental health:
ii. Learner's basic potential:
iii. The level of aspiration and motivation for achievement:
iv. Goals in life:
v. Readiness and will power:

3. Support material/learning resources

Support material is an umbrella term that includes audios, videos, online tutorials, open journals, online tests and all kinds of teaching aids. The teacher alone cannot suffice for all requirements of an effective teaching and learning process. Inclusion of support material increases the effectiveness of the teaching- learning process and makes achievement of learning outcomes easier.

4. Teacher-student relationship

Teacher-student relationship is the cornerstone of a student's social maturation process. Cultivating a good rapport with a non-parental adult authority paves the way to self-discovery, adjusting in the social/cultural environment and developing their emotional intelligence.

Positive relationships with teachers become game changers for kids. Even students with learning and behavior disorders who may be initially stressed out settle down well, physically as well as emotionally, and perform at their very best when the teacher by connecting to them personally creates a positive, safe and structured environment to learn.

5. Instructional facilities

Instructional facilities include all that is required to create a learning environment. Institutions of learning provide classrooms, laboratories, audio-visual presentation rooms, seminar rooms, auditoriums, libraries and other spaces to be used primarily for the purpose of delivering formal instruction to students. These facilities enhance the teaching-learning experience and they must be available in adequate amount to cater to every single student so that equality of opportunity is assured.

6. Teacher-administration relationship

If the relationship between the teacher and the administration/ management of the school is not cordial and professional, it may introduce several hindering factors into the teaching-learning process. It may weigh on the teacher's state of mind which will invariably translate to their body language and unsettle the learners too. To achieve the goals of education and ensure an optimal functioning of the teaching-learning processes, it is essential that there is no adversarial relationship between teachers and administrators.

7. Learning environment/Classroom environment

Learning environment refers to the diverse situations, physical locations, contexts, and cultures in which teaching-learning processes are carried out. Apart from limited and traditional classrooms with rows of desks and a chalkboard or smart board, learning can happen in a wide variety of settings in off-campus outdoor locations. Learning environment encompasses the culture, ethos and characteristics of a traditional school or class in the manner the teacher and the taught interact with and treat one another as well as the ways in which teachers may organize an educational setting to facilitate learning.

8. Institution and Administrative policies

The infrastructure of the institution and the policies framed by their governing bodies, may also affect teaching. If the school lacks required infrastructure or school policies control or restrict the classroom activities, it will invariably constrain the teacher from proper deliverance of the lessons. On the other hand, giving autonomy to the teacher and allowing them the freedom and flexibility to choose teaching methods, classroom activities, etc., will enhance teaching practices as well as learning experiences.

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EXERCISE

1. In a classroom ideal situations is that in which: **[June-2005]**

1. The lecturer delivers his lecture with full confidence as lie prepares himself for the lecture before coming as the classroom.
2. Students come in the classroom with full preparedness and discuss with each other on the object in the presence of the lecturer.
3. Lecturer and the students discuss on the subject
4. While delivering the lecture, the lecturer uses audio-visual means

(a) 1 and 3 (b) 2 and 4
(c) Only 2 (d) Only 4

2. A good teacher should have which of the following features? **[June-2005]**
(a) Should be very intelligent
(b) Should level a simple life
(c) Should be well observed in the subject matter
(d) Should have real affection for his students

3. An effective teacher is one who can : **[December-2005]**
(a) control the class
(b) give more information in less time
(c) motivate students to learn
(d) correct the assignments carefully

4. Which of the following list of factors does not disturb the status of concentration? **[June-2005]**
(a) Transposition, Evaluation, Concentration
(b) Evaluation, Concentration, Illustration
(c) Evaluation, Concentration, Exaggeration
(d) Concentration, Illustration, Exaggeration

5. Which of the following comprise teaching skill? **[June-2006]**
(a) Black Board writing (b) Questioning
(c) Explaining (d) All the above

6. Which of the following statements is most appropriate? **[June-2006]**
(a) Teachers can teach.
(b) Teachers help can create in a student a desire to learn.
(c) Lecture Method can be used for developing thinking.
(d) Teachers are born.

7. Which of the following statements is correct? **[June-2006]**
(a) Syllabus is a part of curriculum.
(b) Syllabus is an annexure to curriculum.
(c) Curriculum is the same in all educational institutions affiliated to a particular university.
(d) Syllabus is not the same in all educational institutions affiliated to a particular university.

8. Which is the most important aspect of the teacher's role in learning? **[December-2007]**
(a) The development of insight into what constitutes an adequate performance.
(b) The development of insight into what constitutes the pitfalls and dangers to be avoided.
(c) The provision of encouragement and moral support.
(d) The provision of continuous diagnostic and remedial help.

9. Verbal guidance is least effective in the learning of: **[December-2007]**
(a) Aptitudes (b) Skills
(c) Attitudes (d) Relationship

10. Teacher uses visual-aids to make learning: **[June-2007]**
(a) simple (b) more knowledgeable
(c) quicker (d) interesting

11. The teacher's role at the higher educational level is to: **[June-2007]**
(a) provide information to students
(b) promote self-learning in students
(c) encourage healthy competition among students
(d) help students to solve their personal problems

12. Which one of the following teachers would you like the most: **[June-2007]**
(a) punctual
(b) having research aptitude
(c) loving and having high idealistic philosophy
(d) who often amuses his students

13. Which is the least important factor in teaching? **[June-2007]**
(a) punishing the students
(b) maintaining discipline in the class
(c) lecturing in impressive way
(d) drawing sketches and diagrams on the black-board

14. A teacher can establish rapport with his students by: **[June-2008]**
(a) becoming a figure of authority
(b) impressing students with knowledge and skill
(c) playing the role of a guide
(d) becoming a friend to the students

15. When a normal student behaves in an erratic manner in the class, you would: **[December-2008]**
(a) pull up the student then and there
(b) talk to the student after the class
(c) ask the student to leave the class
(d) ignore the student

16. Which of the following teacher, will be liked most? **[December-2008]**
(a) A teacher of high idealistic attitude
(b) A loving teacher
(c) A teacher who is disciplined
(d) A teacher who often amuses his students

17. A teacher's most important challenge is: **[December-2008]**
(a) To make students do their home work
(b) To make teaching-learning process enjoyable
(c) To maintain discipline in the class room
(d) To prepare the question paper

18. The most important cause of failure for teacher lies in the area of: **[June-2008]**
(a) inter personal relationship
(b) lack of command over the knowledge of the subject
(c) verbal ability
(d) strict handling of the students

19. The primary duty of the teacher is to **[December-2009]**
(a) raise the intellectual standard of the students
(b) improve the physical standard of the students
(c) help all round development of the students
(d) imbibe value system in the students

20. What quality the students like the most in a teacher ? **[December-2009]**
(a) Discipline (b) Compassion
(c) Idealist philosophy (d) Entertaining

21. Attitudes, concepts, skills and knowledge are products of: **[June-2009]**
(a) Learning (b) Research
(c) Heredity (d) Explanation

22. Which of the following is not a product of learning? **[June-2009]**
(a) Attitudes (b) Concepts
(c) Knowledge (d) Maturation

23. Which of the following skills are needed for present day teacher to adjust effectively with the classroom teaching? **[December-2009]**
1. Knowledge of technology
2. Use of technology in teaching learning
3. Knowledge of students' needs
4. Content mastery
(a) 1 & 3 (b) 2 & 3
(c) 2, 3 & 4 (d) 2 & 4

24. The most important quality of a good teacher is **[December-2010]**
(a) Sound knowledge of subject matter
(b) Good communication skills
(c) Concern for students' welfare
(d) Effective leadership qualities

25. Which one of the following is the most important quality of a good teacher ? **[June-2010]**
(a) Punctuality and sincerity
(b) Content mastery
(c) Content mastery and reactive
(d) Content mastery and sociable

26. Which one of the following is appropriate in respect of teacher-student relationship? **[December-2010]**
(a) Very informal and intimate
(b) imited to classroom only
(c) Cordial and respectful
(d) Indifferent

27. In a lively classroom situation, there is likely to be **[December-2010]**
(a) occasional roars of laughter
(b) complete silence
(c) frequent teacher-student dialogue
(d) loud discussion among students

28. If a parent approaches the teacher to do some favour to his/her ward in the examination, the teacher should **[December-2010]**
(a) try to help him
(b) ask him not to talk in those terms
(c) refuse politely and firmly
(d) ask him rudely to go away

29. The primary responsibility for the teacher's adjustment lies with **[June-2010]**
(a) The children (b) The principal
(c) The teacher himself (d) The community

30. Which one of the following statements is correct? **[June-2010]**
(a) Syllabus is an annexure to the curriculum.
(b) Curriculum is the same in all educational institutions.
(c) Curriculum includes both formal, and informal education.
(d) Curriculum does not include methods of evaluation.

31. A successful teacher is one who is **[June-2010]**
(a) Compassionate and disciplinarian
(b) Quite and reactive
(c) Tolerant and dominating
(d) Passive and active

32. Research has shown that the most frequent symptom of nervous instability among teachers is **[June-2010]**
(a) Digestive upsets (b) Explosive behaviour
(c) Fatigue (d) Worry

33. Which of the following qualities is most essential for a teacher ? **[December-2011]**
(a) He should be a learned person.
(b) He should be a well dressed person.
(c) He should have patience.
(d) He should be an expert in his subject.

34. The essence of an effective classroom environment is **[June-2011]**
(a) a variety of teaching aids
(b) lively student-teacher interaction
(c) pin-drop silence
(d) strict discipline

35. On the first day of his class, if a teacher is asked by the students to introduce himself, he should **[June-2011]**
(a) ask them to meet after the class
(b) tell them about himself in brief
(c) ignore the demand and start teaching
(d) scold the student for this unwanted demand

36. Suppose a student wants to share his problems with his teacher and he visits the teacher's house for the purpose, the teacher should **[December-2011]**
(a) contact the student's parents and solve his problem.
(b) suggest him that he should never visit his house.
(c) suggest him to meet the principal and solve the problem.
(d) extend reasonable help and boost his morale.

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37. A teacher is said to be fluent in asking questions, if he can ask **[December-2011]**
(a) meaningful questions
(b) as many questions as possible
(c) maximum number of questions in a fixed time
(d) many meaningful questions in a fixed time

38. When some students are deliberately attempting to disturb the discipline of the class by making mischief, what will be your role as a teacher ? **[December-2011]**
(a) Expelling those students.
(b) Isolate those students.
(c) Reform the group with your authority.
(d) Giving them an opportunity for introspection and improve their behaviour.

39. A teacher can be successful if he/she **[June-2012]**
(a) helps students in becoming better citizens
(b) imparts subject knowledge to students
(c) prepares students to pass the examination
(d) presents the subject matter in a well organized manner

40. "Spare the rod and spoil the child", gives the message that **[December-2012]**
(a) punishment in the class should be banned.
(b) corporal punishment is not acceptable.
(c) undesirable behaviour must be punished.
(d) children should be beaten with rods.

41. A good teacher must be **[September-2013]**
(a) resourceful and autocratic
(b) resourceful and participative
(c) resourceful and authoritative
(d) resourceful and dominant

42. At the primary school stage, most of the teachers should be women because they **[June-2013]**
(a) can teach children better than men.
(b) know basic content better than men.
(c) are available on lower salaries.
(d) can deal with children with love and affection.

43. While delivering lecture if there is some disturbance in the class, a teacher should **[December-2013]**
(a) keep quiet for a while and then continue.
(b) punish those causing disturbance.
(c) get motivated to teach those causing disturbance.
(d) not bother of what is happening in the class.

44. Effective teaching is a function of **[December-2013]**
(a) Teacher's satisfaction.
(b) Teacher's honesty and commitment.
(c) Teacher's making students learn and understand.
(d) Teacher's liking for professional excellence.

45. Nowadays the most effective mode of learning is **[June-2013]**
(a) self study (b) face-to-face learning
(c) e-learning (d) blended learning

46. A person can enjoy teaching as a profession when he **[June-2013]**
(a) has control over students.
(b) commands respect from students.
(c) is more qualified than his colleagues.
(d) is very close to higher authorities.

47. Which one of the following is considered a sign of motivated teaching ? **[June-2014]**
(a) Students asking questions
(b) Maximum attendance of the students
(c) Pin drop silence in the classroom
(d) Students taking notes

48. Which of the following attributes denote great strengths of a teacher ? **[December-2015]**
(A) Full-time active involvement in the institutional management
(B) Setting examples
(C) Willingness to put assumptions to the test
(D) Acknowledging mistakes
Select the correct answer from the codes given below :
(a) (A), (B)and (D) (b) (B), (C) and (D)
(c) (A), (C) and (D) (d) (A), (B), (C) and (D)

49. What are required for good teaching ? **[December-2015]**
(A) Diagnosis (B) Remedy
(C) Direction (D) Feedback
Select the correct answer from the codes given below :
(a) (A), (B), (C) and (D) (b) (A) and (B)
(c) (B), (C) and (D) (d) (C) and (D)

50. Which of the following factors does not impact teaching? **[June-2015]**
(a) Teacher's knowledge
(b) Class room activities that encourage learning
(c) Socio-economic background of teachers and students
(d) Learning through experience

51. A good teacher is one who : **[June-2015]**
(a) gives useful information
(b) explains concepts and principles
(c) gives printed notes to students
(d) inspires students to learn

52. Greater the handicap of the students coming to the educational institutions, greater the demand on the : **[December-2015]**
(a) Family (b) Society
(c) Teacher (d) State

53. Which of the following factors affect teaching? **[August-2016]**
Choose the correct code to indicate your answer.
(i) Teacher's internal locus of control.
(ii) Learner-motivation.
(iii) Teacher's biographical data.
(iv) Teacher's self efficacy.
(v) Learner's interest in co-curricular activities.
(vi) Teacher's skill in managing and monitoring.
(vii) Teacher's knowledge of the subject including general knowledge.
Codes :
(a) (i), (ii), (iv), (vi) and (vii)
(b) (i), (ii), (iii), (iv) and (v)
(c) (iii), (iv), (v), (vi) and (vii)
(d) (ii), (iii), (iv), (v) and (vi)

54. Select the alternative which consists of positive factors contributing to effectiveness of teaching: **[July-2016]**

List of factors :

(A) Teacher's knowledge of the subject.

(B) Teacher's socio-economic background.

(C) Communication skill of the teacher.

(D) Teacher's ability to please the students.

(E) Teacher's personal contact with students.

(F) Teacher's competence in managing and monitoring the classroom transactions.

Codes:

(a) (B), (C) and (D) (b) (C), (D) and (F)

(c) (B), (D) and (E) (d) (A), (C) and (F)

55. **Assertion (A):** Teaching aids have to be considered as effective supplements to instruction.

Reason (R): They keep the students in good humour.

Choose the correct answer from the codes given below : **[August-2016]**

Codes :

(a) Both (A) and (R) are true and (R) is the correct explanation of (A).

(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

(c) (A) is true, but (R) is false.

(d) (A) is false, but (R) is true.

56. Effectiveness of teaching has to be judged in terms of **[January-2017]**

(a) Course coverage

(b) Students' interest

(c) Learning outcomes of students

(d) Use of teaching aids in the classroom

57. One of the most powerful factors affecting teaching effectiveness is related to the **[January-2017]**

(a) Social system of the country

(b) Economic status of the society

(c) Prevailing political system

(d) Educational system

58. **Assertion (A) :** Learning is a life long process.

Reason (R) : Learning to be useful must be linked with life processes. **[January-2017]**

Choose the correct answer from the following code:

(a) Both (A) and (R) are true and (R) is the correct explanation of (A).

(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

(c) (A) is true, but (R) is false.

(d) (A) is false, but (R) is true.

59. When the learning outcomes of students are ensured with employment of less resources and effort on the part of a teacher and more initiative for self-learning is evident, which of the following expression will describe the teacher most appropriately? **[24th June 2019 (Second Shift)]**

(a) Teacher is successful (b) Teacher is effective

(c) Teacher is intelligent (d) Teacher is practical

60. Which of the following is the key behavior contributing to effective teaching? **[20th June 2019-IInd Shift]**

(a) Summarizing what was told by a student.

(b) Encouraging students to elaborate on an answer.

(c) Using direct and indirect questioning.

(d) Explaining concepts in a logical step by step presentation.

61. From the list given below identify the instructional events which form part of the structure of a lesson plan. Select your answer from the options given below the list.

[21st **June 2019 (First Shift)]**

List of instructional events:

(i) Gaining attention of students.

(ii) Prior knowledge of students.

(iii) Informing the learner of the objectives.

(iv) Stimulating recall of pre-requisite learning.

(v) Checking the availability of reading material in the library.

(vi) Eliciting the desired response.

Options:

(a) (i), (ii), (iii), (iv) (b) (i), (iii), (iv), (vi)

(c) (ii), (iii), (v), (vi) (d) (i), (iii), (iv), (v)

62. Listening is important for a teacher to:

[24th June 2019-IInd Shift]

(a) address the requirement of the learner.

(b) gain knowledge.

(c) keep the learner in good humour.

(d) evaluate the learner for the progress made.

63. For optimising self-learning which of the following motivational principles will be most helpful?

[25th June 2019-IInd Shift]

(a) Using reward and punishment

(b) Creating scope for fulfilling relatedness need

(c) Providing scope for satisfying need for competence

(d) Promoting concerns for meeting status needs

64. Which of the following elements a good classroom communication should adopt? **[26th June 2019-IInd Shift]**

(1) Concreteness (2) Courtesy

(3) Filibustering (4) Fictionalisation

(5) Coherence

Choose the answer from the options given below:

(a) (1), (2) and (4) (b) (2), (4) and (5)

(c) (1), (2) and (5) (d) (1), (3) and (4)

65. A teacher while offering feedback in a classroom transaction utters' No, you are incorrect'. This will be called which type of feedback? **[25th June 2019 (Second Shift)]**

(a) Positive (b) Negative

(c) Confirmatory (d) Corrective

66. Identify the factors affecting teaching related to positive learning environment in an institution:

[2nd Dec. 2019 (First Shift)]

(i) The extent to which teachers make clear presentation

(ii) The scope for sharing and open discussions within the classroom and the institution as such

(iii) Teacher's mastery of the content as reflected in answering students' questions

(iv) Frequent use of positive reinforcers either in the institution or classroom
(v) Availability of teacher and his/her guidance
Choose the correct answer from the options given below:
(a) (i) and (iii) (b) (ii) and (iii)
(c) (iv) and (v) (d) (ii) and (iv)

67. Pitch of the teacher's voice in the classroom is described as **[2nd Dec. 2019-IInd Shift]**
(a) Linguistic (b) Paralinguistic
(c) Non-linguistic (d) Macro-linguistic

68. From the list given below identify those competencies of an effective teacher which relate to the domain of personality and attitude. **[3rd Dec. 2019-Ist Shift]**
(i) Locus of control
(ii) Communicating
(iii) Managing
(iv) Self-efficacy
(v) Teacher enthusiasm
(vi) Being organised and orderly
Select the correct answer from the options given below :
(a) (i), (ii) and (iii) (b) (i), (iv) and (v)
(c) (ii), (iii) and (iv) (d) (iv), (v) and (vi)

69. Which of the following are classroom related factors that influence effectiveness of teaching? **[4th Dec. 2019-Ist Shift]**
(A) Prior task related behaviour of students
(B) Adherence to linear pattern of communication by the teacher
(C) Socio-economic status of the family to which learners belong
(D) Inappropriate use of technological resources by the teacher
(E) Cultural background of students
Choose your answer from the following options:
(a) (A), (B) and (C) (b) (B), (C) and (D)
(c) (A), (B) and (D) (d) (C), (D) and (E)

70. Information overload in a classroom environment by a teacher will lead to **[4th Dec. 2019-Ist Shift]**
(a) High level participation (b) Semantic precision
(c) Effective impression (d) Delayed feedback

71. In which of the following types of learning materials, the presentations are highly structured and individualised? **[4th Dec. 2019-Ist Shift]**
(a) Textbooks prescribed by the universities
(b) Journals and the articles recommended for readings
(c) Writings of great thinkers selected for reflective readings
(d) Programmed instructional and modular learning material

72. Identify the factors that do not contribute to the effectiveness of teaching from the options given below: **[4th Dec. 2019-IInd Shift]**
(A) Socio - economic background of Teacher
(B) Teacher's skill in pleasing the students
(C) Teacher's subject knowledge
(D) Teacher's personal contact with students
Choose the correct option .
(a) (A), (C) and (D) (b) (B), (C) and (D)
(c) (A), (B) and (C) (d) (A), (B) and (D)

73. In a group setting which of the following factors hinder creativity of its members? **[5th Dec. 2019-Ist Shift]**
(A) Norm to maintain consensus at any cost
(B) To think without any fear of being ridiculed\
(C) To respect one another's ideas
(D) To criticize if somebody's idea is not correct
Choose the correct option:
(a) (A) and (C) only (b) (B) and (D) only
(c) (C) and (B) only (d) (D) and (A)only

74. Which of the following factors have been labelled as 'social competence' in influencing learning? **[6th Dec. 2019-IInd Shift]**
A. Socio-economic status
B. Motivation
C. Intelligence - general and specific
D. Emotional well - being
E. Inability to translate thoughts into action
Choose the correct answer from the options given below:
(a) A, B and C only (b) B, C and D only
(c) A, B and D only (d) C, D and E only

75. Which of the following will be considered key teaching behaviour belonging to the category of effectiveness? **[6th Dec. 2019-IInd Shift]**
A. Making ideas clear to learners who may be at different level of understanding
B. Showing enthusiasm and animation through variation in eye contact, voice and gestures
C. Using student ideas by acknowledging and summarizing
D. Probing through general questions and shifting a discussion to some higher thought level
E. Using meaningful verbal praise to get and keep students actively participating in the learning process
Choose the correct answer from the options given below:
(a) A, B and C only (b) A, B and E
(c) B, C and D only (d) C, D and E only

76. Which one of the following factors does not contribute to learning mathematical concepts **[5th Dec. 2019-Ist Shift]**
(a) Real life events
(b) Assessing the existing mathematical knowledge of the learner before deciding the syllabi
(c) Teaching mathematics and history together
(d) Narrating the life experiences of the mathematician who has given the concept

77. Choose two factors that do **NOT** affect the academic performance of students adversely : **[4th Dec. 2019-IInd Shift]**
(A) Low self - efficacy belief
(B) Belief in God
(C) Indifferent attitude towards politics
(D) Teacher's low expectation from students

Choose the correct option :
(a) (A) and (B) only (b) (B) and (C) only
(c) (C) and (D) only (d) (B) and (D) only

78. Given below are two statements — One is labelled as Assertion (A) and the other is labelled as Reason (R).

[2nd Dec. 2019-IInd Shift]

Assertion **(A):** If a teacher wants to improve his or her abilities as an effective classroom communicator, he or she should first understand the students.

Reason **(R):**The ability to understand students and intended listening are disjointed propositions.

In the light of the above two statements, choose the correct option from the following :
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A)
(c) (A) is true, but (R) is false
(d) (A) is false, but (R) is true

HINTS & EXPLANATION

1. (a) Statement 1 is the ideal situation for Lecture method of teaching; statement 3, Discussion method.
Statement 2 is not ideal as the teacher has no role; statement 4 is not ideal because audio-visual aids are not used in lecture method.

2. (d) The major characteristics of a good teacher are;
- **sound** subject knowledge
- **prepared** with clear objectives for lessons
- **rapport** with students
- **approachable** and affectionate
- **good** communicator
- **strong** work ethic
- **effective** class management
- **encouraging**
- Unless the teacher is kind and affectionate towards the students, the connect essential between the two for smooth flow of effective communication will be lacking; and, this will defeat the very purpose of teaching-learning process.

3. (c) Controlling the class, dispensing maximum information or correcting assignments carefully are requirements of secondary importance. The most important purpose of teaching is to generate in learners the curiosity to know; and to motivate them to learn. All activities undertaken in the educational process is woven around this objective. So, effective teaching motivates students to learn.

4. (d) In the process of teaching, **Concentration,** of not only the learners but also the teacher, is the prerequisite on which the other elements are constructed. It is followed by **Illustration** (or exposition) to facilitate understanding; thereafter, the concept can be **exaggerated** (or elaborated). **Evaluation** is done after a **Recapitulation** of the lesson taught.

5. (d) All the above
Blackboard is an important visual aid used extensively in classroom teaching. It is a reusable surface on which text is written, figures are drawn, and problems worked out.
Explaining the course material, topics, sub-topics is imperative for any teacher.
Questioning is an important skill that teachers use to get feedback from students and to retain their attention.

6. (b) Teacher's help can create in a student a desire to learn.
Teachers are not born; teaching is an art which one has to learn, cultivate and train for. Not all teachers can teach; being a qualified teacher is the basic requirement, but the art of effective teaching is only wilfully learnt with dedication, practice and experience. Committed teachers are successful in inspiring students to learn.

7. (a) Syllabus is a part of curriculum.
Curriculum is an umbrella term encompassing all academic and co-academic activities within the school premises. It includes instructional practices, learning experiences, students' performance assessment, social behaviours and thinking skills apart from textual content of specific subjects.
Syllabus refers only to the academic component of the process of classroom teaching-learning and contains all the concepts/topics to be covered in a specific subject.

8. (c) The teacher's first and foremost duty is to provide moral support and encouragement to learners so that they proceed towards achievement of learning goals. Absence of support or encouragement often deters learners from trying, or leads them astray. Remedial help may be required at a later stage when some learning deficiency is detected. Awareness about adequate performance or avoidance of pitfalls and dangers is of secondary importance.

9. (b) Visual guidance is usually accompanied by the verbal component in order to make messages clearer. Aptitudes or attitudes for specific action can be learnt/ acquired with such guidance. Verbal symbols/ expressions of polite communication are indispensable in building relationships. However, skills which pertain to the ability to do something with flair, can be learnt /acquired with keen observation and passionate hands on practice only; with little or no use of verbal inputs.

10. (d) Visual aids are objects/ devices/ media such as charts, graphs, pictures, maps, presentations, projections, etc., that aid the teacher in getting their messages across clearly and concisely; and at the same time, enhance

the learning experiences of students by arresting their attention, holding their interest and raising their comprehension of a topic.

11. (b) The teaching goals in higher education are:
- Mentoring young academics
- Motivating scholars to search for knowledge
- Promoting self-learning in scholars
- Facilitating students to attain mastery of the chosen field
- Helping students find their voice and articulacy
- Inspiring scholars to inculcate values and practice ethics

12. (b) A teacher's likeable qualities are:
- ability to foster relationships with their students
- propensity to respect students
- accessibility and patience
- compassion, warmth and politeness
- knowledge of learners' psychology, issues, strengths and weaknesses
- enthusiasm and aptitude for research
- dedication to teaching
- skill in engaging learners

13. (a) Factors that are important in effective teaching are:
- discipline in the class
- full attention on the topic of discussion
- teaching in an impressive manner
- relevant black-board work
- good classroom communication
- congeniality, accessibility and patience of the teacher
- education and knowledge base of a teacher

If teaching is effective, students are attentive; they understand and enjoy the lesson; and, complete assignments successfully. This leaves little room for disturbance of any kind or need to punish anyone. So, punishing students is the least important factor in teaching.

14. (b) Authoritarianism is more often counterproductive. Students are impressed most by the teacher's knowledge and skill which is what is required to guide them effectively. The teacher who does this in a friendly manner is more successful in establishing a rapport with them. But, without knowledge and skill, nothing else works.

15. (b) Rebuking or sending the student out of the class is a punitive measure which humiliates; and, triggers resentment and defiance. Ignoring the student sends the message that such conduct is acceptable; it emboldens the student as well as others to repeat the behaviour. Talking to the student after the class is likely to draw a greater and calmer reception and the chances of reform are increased.6

16. (b) High idealistic attitude of the teacher often distances students. Disciplined teachers are unable to build the requisite rapport for achievement of instructional objectives. Teachers who amuse the class often do it at the cost of individual students, ridiculing them or making them the butt of their jokes; and, are therefore likely to be disliked by many. A loving, , patient and compassionate teacher is approachable and hence, is generally liked by students.

17. (b) Maintaining discipline or making students do their homework in the classroom is not difficult with authoritative, coercive and punitive powers invested in the teacher. Preparing question papers for proper evaluation is a skill that can be cultivated. However, making the lesson enjoyable is a big and important challenge for it involves holding the concentration of the taught throughout and keeping them motivated towards achieving the desired outcomes successfully.

18. (b) Content mastery is the most important characteristic of effective teaching. With all other positive qualities such as good interpersonal relationship and effective verbal ability which endear the teacher to the students and prepare requisite groundwork for teaching-learning process, if the teacher lacks command in the subject to be taught, students lose interest and the whole purpose gets defeated. Strict handling of students has varying results depending on other factors.

19. (c) The primary duty of the teacher is to help all round development of the students.

20. (b) Compassion in a teacher builds relationships with the students; creates a positive environment; and raises students' self-esteem. Entertaining teachers are prone to going overboard at times and end up annoying students. Discipline and idealist philosophy are in fact disliked by students.

21. (a) Learning is the lifelong process of transforming information and experience into knowledge, skills, behaviours, and attitudes.

22. (d) Learning is the life long process of transforming information and experience into knowledge, skills behaviours and attitude. Maturation is a biological process based on heredity; it is not an outcome of learning.

23. (c) 2, 3 & 4

To adjust effectively with the classroom-teaching, the present day teacher need not be a tech geek but must know how to use technology in teaching learning, in addition to knowing about students' needs in changing times. Mastery in one's content is essential because, any knowledge imparted can be verified on the Internet.

24. (b) Although all these are qualities of a good teacher, the most important of these is communication skills. Unless a teacher is able to communicate well, none of the elements of the process of teaching and learning, namely explaining of the topic, questioning, etc., are likely to be accomplished to the desired level.

25. (d) A great teacher knows his students well; is kind, patient, and caring and has the ability to develop relationships with them; has mastery in the content; is dedicated to teaching and skilled in engaging students in learning.

Proactive teachers anticipate unexpected events throughout the day and keep a contingency plan ready for addressing the surprises so that there are few reasons to panic. A proactive teacher decides a

learning path beforehand, and executes it. The reactive teacher responds to the student trying things out and dynamically tailors the teaching experience. Though a mix of both approaches is practised; being proactive is the more important and desirable quality.

Punctuality and sincerity are less important qualities.

26. (c) If teacher-students relationship is very informal and intimate, it threatens to compromises discipline.

It cannot be limited to classroom because students often face problems outside the classroom which have a bearing on their classroom behaviour; and, the teacher needs to perceive those and help restore order.

If it is indifferent, the rapport required for fruitful interaction cannot be built.

27. (c) Occasional roars of laughter may occur when a humorous piece of literature is being discussed or the teacher is displaying a sense of humour. In usual transaction of serious topics, even in lively classrooms, such guffaws are unlikely. However, frequent teacher-student interaction is ideal when the topic being dealt with is understood well. Such a class is lively, which is contradictory to a completely silent classroom.

28. (c) A teacher must be unbiased and honest and should have effective interpersonal skills. Requests for undue favours must be nipped in the bud but within the realm of polite communication.

29. (c) The teacher himself.

30. (a) Syllabus connotes the subjects including topics and subtopics covered in a course of study. Curriculum, on the other hand, implies the academic content to be taught; the methodology of teaching and evaluating; the skills and competencies students should learn during study; and the educational objectives that are expected to be met; in an education system.

31. (a) Each of the options contains a pair of opposing qualities in a teacher. As a teacher who is quiet, dominating or passive will not be able to conduct classes in the desired manner, the options containing any of these are ruled out.

32. (b) Commonly observed emotional symptoms of neurological problems or nervous instability are:

- mood swings or sudden outbursts
- delusions
- muscle weakness
- partial or complete loss of sensation
- seizures
- difficulty reading and writing
- poor cognitive abilities
- unexplained pain
- decreased alertness

Among teachers, the most common symptom of it is sudden outbursts or explosive behaviour.

33. (c) He should have patience.

Whether learned, subject expert or well dressed, a teacher is not worth his salt if he does not have patience to explain until understood and to hear out doubts and problems until concepts are clear to students.

34. (b) Teachers who create positive classroom environment, build a rapport with their students and engage them in lively interaction are successful in meeting students' developmental, emotional and educational needs. The essence of an effective classroom environment is lively student-teacher interaction.

35. (b) Introducing oneself in first meeting with others is a positive gesture, a mark of confidence and the foundation of fruitful interpersonal relations which is imperative for meeting instructional objectives in the classroom. Dismissing, ignoring, snubbing or scolding students will be counterproductive.

36. (d) It is the teacher's responsibility to help in solving, to the best of his/her ability, any problem that a student faces in order that it does not hinder their learning. He/she should be ready to lend a patient ear to their grievances and extend all possible help.

The student's problem could possibly be about their parents themselves; so, involving them would not help. Stopping them from visiting the teacher's house again would deter them from opening up about any problem being faced. Suggestion to meet the Principal would also be futile because students generally perceive the Principal as an authoritative figure and not someone in whom they could confide.

37. (a) meaningful questions.

It is an important characteristic of a teacher to be able to ask questions that are sensible and well understood by the students. Instructional outcomes as well as evaluation are distorted if the teacher fails to frame questions correctly. A fluent teacher is one who can frame meaningful questions which get the desired responses.

38. (d) Giving them an opportunity for introspection and improving their behaviour.

Expelling the errant students would be a dead end and would only exacerbate their behaviour problem.

Isolating them (in the class) would fail to correct their conduct; while they would continue to disturb the class and impede the learning process. Exercise of authority is known to be counterproductive in any attempt at reformation.

39. (a) helps students in becoming better citizens.

The purpose of education is to prepare better citizens rather than making students merely accumulate knowledge and pass exams.

40. (c) "Spare the rod and spoil the child", means that children go haywire if not punished for delinquency. So, the message is that undesirable behaviour should be curbed by punitive action.

41. (b) An authoritative, dominant or autocratic teacher fails to make the desirable connect with the class which is essential to achieve the learning outcomes. An effective teacher is resourceful enough to make learning happen in the classroom; participates fully in the process of teaching-learning; demonstrates class management skills; promotes positive behaviours and commands respect.

42. (d) can deal with children with love and affection.
Women are traditionally believed to be more affectionate and caring; hence, it is held that majority of the teachers at the primary school stage should be women.

43. (c) Motivate to teach those causing disturbance.
Keeping quiet for a while and then continuing will not improve the situation. Punishing those causing disturbance will generate resentment in students and learning will get hampered. Not bothering about what is happening in the class is the mark of an inefficient teacher. The teacher ought to realise that some students creating disturbance in the class signifies that the ongoing teaching lacks merit to hold those students' attention; and hence get motivated to focus on those particular students so that they fall in line with the learning of the whole class.

44. (c) Teacher's making students learn and understand.
Success of teaching is measured in terms of the achievement of learning objectives and outcomes. Teachers' honesty, commitment, satisfaction, or liking for professional excellence is of little use unless students have learnt and grasped the lesson transacted.

45. (d) Blended learning is an education program (formal or non-formal) combining online digital media and traditional classroom methods. However, it requires the physical presence of both teacher and student.

46. (b) commands respect from students.

47. (a) Motivation is a psychological positive that enhances cognitive processing and directs behaviour towards attainment of goals. Sense of relevance, Freedom from Fear, Sense of Individual Purpose, and Passion are the characteristics of motivated students.
Maximum attendance, silence and taking notes in the class can be outcomes of fear not motivation.

48. (b) (b), (c) and (d)
Attributes denoting great strengths of a teacher are:
- Setting examples
- Willingness to put assumptions to the test
- Acknowledging mistakes

49. (a) (a), (b), (c) and (d)
Diagnosis yields information that can be used to determine what needs to be done to improve a situation, action or achievement, and to suggest a prescription.
Remedial teaching is identifying slow learners and providing them with the necessary help and guidance to help them overcome their problems, after identifying their areas of difficulty.
Direction of teaching pertains to setting goals, deciding on actions to achieve those goals and mobilizing the resources needed to take those actions. Schools plan a direction to follow in order to achieve the broad goals of improving student outcomes and responding to changing demographics while staying within the funding box they are given. Students get their direction from the feedback they are given through evaluation process.
Giving students feedback in the classroom during the learning process increases learning and improves student outcomes, it has been proved. When given correctly, feedback guides the student in their learning process and gives them the direction they need to reach the target or goal of the lesson. Feedback sends a message to the student that the instructor cares about the learning taking place. It also allows the student to become more engaged and involved in the classroom.

50. (c) Socio-economic background of teachers and students
Some factors that impact teaching & learning are:
- vast curriculum
- pace and scope of change in schools
- time devoted to noncore teaching tasks
- requirement to teach unfamiliar subjects
- vocational education
- teacher's knowledge
- classroom activities
- learning through experience

51. (d) Characteristics of a good teacher are:
- an engaging personality and teaching style
- clear objectives for lessons
- effective discipline skills
- good classroom management skills
- good communication with parents
- highly encouraging
- knowledge of curriculum and standards
- knowledge of subject matter
- passion for children and teaching
- inspires students to learn

Giving useful information, explaining concepts and principles; and, handing out printed notes to students are part of the job responsibilities that every teacher has to fulfil.

52. (c) A teacher is entrusted with the task of educating the students enrolled in his/her class. This trust is officially placed on the teacher by the State through the Ministry of Education which governs the education system; and the family of the child that sends the child to school to get educated as well as the society as a whole that believes in the institution of learning. Hence, the teacher is directly responsible for the education of a child. Therefore, the greater the handicap of the students coming to the educational institution, the greater is the demand on the teacher.

53. (a) Teacher's biographical data and learner's interest in co-curricular activities has negligible bearing on the teaching that takes place in the classroom, assuming that ideal teaching environment prevails inside.

54. (d) Factors which consists of positive factors contributing to effectiveness of teaching are–
- Teacher's knowledge of the subject
- Communication skill of the teacher
- Teacher's competence in managing and monitoring the classroom transactions

55. (b) Both (A) and (R) are true, but (R) is not the correct explanation of (A)

Teaching aids indeed amuse students but they are considered as effective supplements to teaching not for this reason; rather, because they involve audio-visual senses and enhance motivation, attention, retention and recall.

56. (c) Effectiveness of teaching has to be judged in terms of learning outcomes of students.

57. (d) The social, political and economic factors play a role in the quantum and quality of education received; but the effectiveness of teaching depends on the efficacy of the Educational system which comprises everything that goes into educating public-school students at the federal, state, or community levels:

- Laws, policies, and regulations
- Public funding, resource allocations, and procedures for determining funding levels
- State and district administrative offices, school facilities, and transportation vehicles
- Human resources, staffing, contracts, compensation, and employee benefits
- Books, computers, teaching resources, and other learning materials

Compromise in any one or more of these has a direct bearing on the effectiveness of teaching.

58. (a) Both (A) and (R) are true and (R) is the correct explanation of (A).

59. (b) Teaching is a planned activity/process carried out with the aim of fulfilling certain learning objectives and achieving certain learning outcomes. The teacher/ teaching is **effective** if s/he ensures the learning outcomes with children motivated for self-learning. In such a scenario, less effort on the teacher's part and less use of aids and resources is required.

'Successful 'includes the financial/monetary aspect of personal growth. 'Intelligent' pertains to higher order thinking skills. 'Practical' is concerned with actual practice or use of theories and ideas.

60. (d) 'Teaching for understanding' i.e., reducing textbook information to concepts/areas of critical understanding and presenting logical step-by-step instruction/ explanation around big ideas is a key behaviour contributing to effective teaching.

Several other research-based teaching behaviours or presentation techniques have been found to be effective for all students at all levels. For instance,

Explicit Instruction: informing students about what they are going to learn, what is its rationale and its relation with their previous learning and what learning outcome is expected of them; and providing a standard/ model work for students to compare their output with.

Scaffolded Instruction: providing students continual support as they proceed but gradually reducing the level/quantum of help as students demonstrate competence in working independently.

61. (b) Prior knowledge of students and checking the availability of reading material in the library are not part of the instructional event or lesson plan.

The following nine steps have been adapted from Gagné, Briggs, and Wager (1992).

1. Gain attention of the students
2. Inform students of the objectives
3. Stimulate recall of prior learning
4. Present the content
5. Provide learning guidance
6. Elicit performance (practice)
7. Provide feedback
8. Assess performance
9. Enhance retention and transfer to the job

62. (a) Listening is important for feedback. Unless the teacher listens, s/he will not receive the feedback on how effective the teaching was and what was left to be desired; or what the learner requires for effective learning.

63. (c) The pre-requisite for self learning is the desire to learn and competence to achieve learning objectives. Reward and punishment, and fulfilling needs of status or relatedness are concepts of classroom learning or teacher oriented learning.

64. (c) Correctness of communication is essential for positive learning outcomes. Courtesy on the part of teachers as well as learners keeps strife at bay. Coherence in communication is necessary for proper conveyance of intended messages.

Both, 'Filibustering', i.e., obstructing the process, and 'fictionalization', i.e., compromising the truth, are counterproductive.

65. (b) Negating a response is negative feedback. Positive or confirmatory feedback contains approval or affirmation (Yes, correct, etc.). Corrective feedback includes guidance towards correct response.

66. (d) Interacting, sharing information, allowing open discussion and using frequent reinforcers keep the students motivated and encourage them to express themselves freely. All this creates a positive environment for effective teaching. The teacher's availability, mastery of the content and ability for clear presentation are teacher related factors which do not involve students.

67. (b) Paralinguistics are the aspects of spoken communication that do not involve linguistics, i.e., the language with its grammar, syntax, and phonetics. The pitch of a voice is thus paralinguistic.

68. (b) Teacher competencies in the domain of personality and attitude are: locus of control, self efficacy, teacher enthusiasm. Communication and management are specialised skills; and being organised and orderly is a matter of choice/preference.

69. (c) The following factors influence effective-ness of teaching:

- Prior task related behaviour of students: Transaction of any lesson ideally begins with a recall/discussion/

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assessment of their previous knowledge on the topic. Their behaviour in this regard determines how receptive they will be to the teaching.

- Adherence to linear pattern of communication by the teacher: As linear pattern is minus feedback from the receiver, the teacher gets no clue of the effect of teaching on the learners and there is no scope of any modification even if it is called for.
- Inappropriate use of technological resources by the teacher: If the technological resource is not used appropriately, the desired outcome cannot be attained.

70. (d) Information overload leads to delayed comprehension in the learner which in turn, leads to delayed feedback. When grasp / comprehension of the topic taught is slow, semantic (of meaning) precision or effective impression are not possible; and participation, too, is low and hesitant.

71. (d) Textbooks prescribed by universities are meant to be used for teaching all students of a particular grade; and recommended articles and journals as well as writings of great thinkers selected for reflective readings are meant for all interested learners.

However, programmed instructional and modular learning material is designed for step-wise individual learning. It is highly structured with a sequence of instructional "frames" of programmed material for students to work by themselves at their own speed and answer questions after each step to evaluate their learning. They are then immediately shown the correct answer or given additional information.

72. (d) Teacher's subject knowledge is the basic requirement for any kind of teaching to be effective.

On the other hand, the socio - economic background of the teacher, their personal contact with students or their skill in pleasing students does not affect the quality of teaching.

73. (d) Creativity is stimulated if team members avoid consensus and challenge each other; however, criticism and conflict among team members can hinder creativity.

If team members respect one another, they will think without fear of being ridiculed; otherwise, they may be unwilling to share vital knowledge and skills.

74. (c) Social competence relates to one's ability to communicate and interact with the people in the teaching-learning environment which directly influences learning. Several factors determine one's social competence. One's socio-economic status or the caste of birth/income class/religious community has a telling effect on one's level of confidence/ease to communicate and act, quality of social circle, access to opportunities and affordability of resources. All this is crucial to one's emotional well being and also determines the level of motivation one has to achieve one's goals.

75. (b) A,B,E

Effective teaching behaviour/skills includes

- making oneself clear to all learners regardless of their individual differences.
- using effective non-verbal communication such as enthusiasm and animation through variation in eye contact, voice and gestures to keep students engaged/ involved in the learning process.
- using meaningful verbal phrase to maintain active participation of students.

On the other hand,

- acknowledging and summarising students' ideas is not effective in learning; using those to connect/build further ideas is.
- probing general questions or shifting a discussion to higher thought level defeats the planned learning objectives; teaching must be appropriate for the specific topic as well as the specific class level.

76. (c) Mathematics has been accepted as an importance component of formal education from ancient period to the present day. Most of respondents and instructors agreed that demographic, instructional strategies and methods and individual factors are the most influential factors in learning mathematics. According to 'Underhill' beliefs in mathematics is the summary of four beliefs, namely (i) beliefs in Mathematics as a discipline, (ii) beliefs in learning Mathematics, (iii) beliefs in teaching Mathematics, and (iv) beliefs in one self in the context where Mathematics learning occurs. Thus teaching mathematics with any subject like history or other does not contribute to learning mathematical concepts.

77. (b) Students' academic performance is an output of their learning ability, motivation, and hard work. However, if the student has a low self-efficacy (belief in his or her capacity to execute behaviours necessary to produce specific performance/ attainments) or the teacher's expectation from him/her is low, it is likely to affect the academic performance considerably. Belief in God is a matter of faith; while indifference towards politics is a matter of choice. Neither has any bearing on a student's academic performance.

78. (c) Two events (or propositions) are mutually exclusive or disjoint if they cannot both occur at the same time.

It is of course true that if a teacher wants to improve his or her abilities as an effective classroom communicator, he or she should first understand the students. And to understand them, it is imperative to listen effectively to their messages. So, understanding students and intended listening are not disjointed propositions.

CHAPTER 4

Methods of Teaching in Institutions of Higher Learning

Teaching methods are divided into two classes as **teacher centered** and **learners centered**.

Teaching, as conventionally understood by a traditional teacher is the act of disseminating information to another individual or a group of individuals in the classroom. In this type, the teaching is focussed on narration by the teacher and on the part of learners' listening, retention and recall. The teaching environment is very much formalized and the teacher occupies central position in the classroom. Here the learners acquire knowledge or information with practically an opportunity to develop understanding, application and skills. They know the information but they cannot correlate this to the daily life situations. This method also fails to draw the total attention of the learner towards learner's abilities. Hence there arose the need for new methods, strategies and techniques that are suitably and effectively used in modem days.

TEACHING STRATEGIES

Teaching strategies can be classified under the following two heads:

a. Autocratic style: It involves the following strategies:

- Lecture
- Lesson demonstration
- Tutorials
- Programmed instruction

b. Permissive style: It includes the following strategies

- Question-Answer
- Heuristics
- Projects
- Review
- Group discussion
- Role-playing
- Assignment
- Discovery
- Computer assisted instruction
- Brain storming
- Independent study

Different Methods of Teaching

Discussion/debates
Cooperative teaching
Collaborative work
Problem-based learning (PBL)
Heuristic method (Problem solving)
Case study Method
Demonstration method
Inductive method
Deductive method
Analytical method
Synthetic method
Verbal or oral method
Written method
Laboratory method
Practical methods
Explanatory method
Activity-oriented method
Designing and presenting a project
E-learning

Table of comparison: Teacher-Centered vs. Learner-Centered Method

Concept	Teacher Centered	Learner Centered
Knowledge	Transmitted by instructor	Constructed by students
Student participation	Passive	Active
Role of professor	Leader/authority	Facilitator/learning partner
Role of Assessment	Few tests/assignments—mainly for grading	Many tests/assignments—for ongoing feedback
Emphasis	Learning correct answers	Developing deeper understanding
Academic culture	Individualistic and competitive	Collaborative and supportive
Student participation	Passive	Active
Role of professor	Leader/authority	Facilitator/learning partner
Role of Assessment	Few tests/assignments—mainly for grading	Many tests/assignments—for ongoing feedback
Emphasis	Learning correct answers	Developing deeper understanding
Academic culture	Individualistic and competitive	Collaborative and supportive

OFF LINE VS. ONLINE METHODS (SWAYAM, SWAYAMPRABHA, MOOCs ETC.)

In offline teaching and learning, students are able to interact with their teachers and peers face-to-face.

Online teaching and learning is the newest and most popular form of distance education today. Online learning is education that takes place over the Internet. It is often referred to as "e-learning" among other terms.

Advantages of Offline Methods of Teaching

Collaborative learning	• Basically, the classroom environment is important to encourage and motivate collaborative learning. • Collaborative learning increases student's self-awareness about how students learn and enables them to learn more easily and effectively, transforming them into keen learners inside and beyond the classroom.
Critical thinking	• Classroom teaching enhances students' critical thinking skills. • Classroom studying provides an opportunity for students to engage in live discussions where they can better utilise their critical thinking skills to voice opinions or involve in an argument.
Rapport with teachers and making friends	• When students are in a classroom, they learn social interactions with peers, make friends, and also establish rapport with teachers. It is vital for children to develop socially along with their academic education.
Conflict resolving and building team spirit	• Classroom teaching inculcates conflict resolving skills, presentation skills when it comes to presenting their ideas confidently in front of peers, develops team spirit, and teaches them to get along with those from different cultural backgrounds. • These kinds of experiences benefit in moulding students' communication and listening skills and it helps them in growing and maturing emotionally.
Importance of a teacher	• The presence of a teacher physically in a classroom keeps the students attentive and inspired throughout the lecture, and additionally also initiates participation in interesting activities. This enables students to retain more from what they have learned during a session. • In this method, teachers can also modify their teaching style based on types of learners in their classroom i.e. classroom activities can help visual learners and interactions can help auditory learners amongst others. • Through this process, teachers can get an idea of whether the students are following what has been taught or they require further explanation. • Furthermore, students can also clarify their doubts immediately after the chapter is over or a topic is over.
Skill development	• Classroom teaching teaches students how to develop organizational skills, beginning with the basics, such as arriving at school on time. • In a live classroom, students are held accountable for being prepared to do school work, which includes doing their homework the night before, being ready for a sort of quiz or competition, submitting assignments in time or before their due date and prepare for classroom discussion or any group discussion. • All these help students in organizing themselves and their time, prioritise their homework, assignments, and playtime.

Advantages of Online Methods of Teaching

There are **many benefits of online learning** like flexibility of time; plenty of choices; cost benefits; comfortable environment to study; career advancement study even while working, gaining skills that are transferable; no necessity of commuting; and learning at home. Online method offers advantages to teachers as well as learners.

Develop self-discipline	• It helps learners to develop self-discipline and also join study groups from different places to understand perspectives.
Convenience and flexibility	• Teaching online offers instructors more options for engaging in instructional activities. • Online faculties have more flexibility in teaching during non-traditional class times. • They can also teach anywhere they have access to the Internet. • Some examples include teaching from home or while traveling to a conference.

Getting to know students better	• The online environment provides a more comfortable venue for inhibited students to participate in course activities and discussions. • This increases the pool of participants, the likelihood of varied perspectives, and the richness of course discussion. • At the same time, the online environment attracts students who are self-motivated and more likely to initiate conversations, pose questions, and collaborate with their peers and instructor. • And, since every student is expected to post a response to the discussion board, the instructor gets a strong sense of his/her students' understanding of course material.
Greater engagement and learning	• In online courses, students' engagement and learning increases. • Since all students are required to participate in discussion threads, every student needs to work through different problems and generate ideas and solutions. • Students who typically don't participate in the face-to-face course are more likely to post to a discussion and interact with their peers in the learning process. • Since students have more time to reflect and respond to the instructor's question, instructors get more in-depth, researched responses from students.
Efficiency	• Instructors find increased efficiency in some rote tasks. Some tools in online teaching automate processes and save instructors' time.
Enriching experience	• By teaching online, instructors reach a broader student population that would not have been otherwise possible. • Interacting with students from different parts of the country or the world not only enhances the students' learning experience but also the instructor's.

SWAYAM in a nutshell

1. One-stop web and mobile based interactive e-content for all courses from High School to University level.
2. High quality learning experience using multimedia on anytime, anywhere basis.
3. State of the art system that allows easy access, monitoring and certification.
4. Peer group interaction and discussion forum to clarify doubts
5. Hybrid model of delivery that adds to the quality of classroom teaching.

Massive Open Online Courses (MOOCs)

- **MOOC** is essentially an asynchronous platform and a process for teaching through pre-recorded lectures, resource video materials, lecture notes, assignments and quizzes, which are usually online and provide self assessment in regular intervals during learning.
- The learning, through scheduling of fixed time duration for completion of courses and, therefore, the simultaneous participation of teachers and a large number of students may be termed synchronous and is thus similar to a classroom, albeit on the Internet and being much larger in size.
- When offered with consideration for students in non-urban and rural areas through supplementary DVDs and mobile delivered content, they enable quality and equitable access to a much larger population of students and can lead to a significant rise in the Gross Enrollment Ratio.
- These courses are open for anyone to access – at no cost. So anyone who is interested in learning gets access to quality content, which also includes discussion with the content creator and access to assignments for self testing.
- The faculty who are currently offering courses are from the IITs or from other reputed institutes such as CMI, IMSc etc.

Key e-learning initiatives run by MHRD	
(i) SWAYAM	• The 'Study Webs of Active Learning for Young Aspiring Minds' (SWAYAM) an integrated platform for online courses, using Information and Communication Technology (ICT) and covering school (9th to 12th) to Post Graduate Level. • At present, about 1000+ MOOCs Courses are listed on SWAYAM, wherein about 30 Lakhs students have enrolled to these courses. • It also offers online courses for students, teachers and teacher educators.
(ii) SWAYAM Prabha	• SWAYAM Prabha is an initiative to provide 32 High Quality Educational Channels through DTH (Direct to Home) across the length and breadth of the country on 24X7 basis. • It has curriculum based course content covering diverse disciplines.

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(iii) National Digital Library (NDL)	• The National Digital Library of India (NDL) is a project to develop a framework of virtual repository of learning resources with a single-window search facility. • There are more than 153 Lakhs digital books available through the NDL.
(iv) E-pathshala	• E-books of the resources developed by National Council of Educational Research and Training (NCERT), State Council of Educational Research and Training (SCERT) / State Institutes of Education (SIEs), State boards etc. • SIEs in multiple languages and uploaded on e-pathshala website and disseminated through mobile app (android, iOS and Windows). • E-pathshala has been listed/made available on the UMANG App of Govt. of India, which was launched by Hon'ble Prime Minister of India on 23 November, 2017 during GCCS-2017.
(v) National Repository of Open Educational Resources (NROER)	• To make digital resources available for teachers and students as free and open source material. • To enable the participation of the community in development and sharing of digital resources. • To facilitate the adoption and creation of digital resources in different Indian languages.
(vi) e-Shodh Sindhu	• Consortia for Higher Education e-resources is to provide access to quality electronic resources including full-text, bibliographic and factual databases to academic institutions at a lower rates of subscription.

EXERCISE

1. Discussion Method can be used when : **[December-2004]**
(a) The topic is very difficult (b) The topic is easy
(c) The topic is difficult (d) All the above

2. Team teaching has the potential to develop : **[December-2005]**
(a) Competitive spirit
(b) Cooperation
(c) The habit of supplementing the teaching of each other
(d) Highlighting the gaps in each other's teaching

3. Which of the following methods of teaching encourages the use of maximum senses ? **[December-2005]**
(a) Problem-solving method (b) Laboratory method
(c) Self-study method (d) Team teaching method

4. Which of the following statements is not correct? **[December-2006]**
(a) Lecture Method can develop reasoning
(b) Lecture Method can develop knowledge
(c) Lecture Method is one way process
(d) During Lecture Method students are passive

5. Maximum participation of students is possible in teaching through: **[December-2007]**
(a) discussion method (b) lecture method
(c) audio-visual aids (d) text book method

6. Micro teaching is most effective for the student-teacher: **[June-2007]**
(a) during the practice-teaching
(b) after the practice-teaching
(c) before the practice-teaching
(d) none of the above

7. Which of the following is more interactive and student centric? **[December-2009]**
(a) Lecture (b) Workshop
(c) Seminar (d) Group Discussion

8. Micro teaching is more effective **[December-2009]**
(a) during the preparation for teaching-practice
(b) during the teaching-practice
(c) after the teaching-practice
(d) always

9. The best method of teaching is to **[December-2012]**
(a) impart information
(b) ask students to read books
(c) suggest good reference material
(d) initiate a discussion and participate in it

10. Which one of the following is the best method of teaching? **[September-2013]**
(a) Lecture method (b) Discussion method
(c) Demonstration method (d) Question-Answer method

11. Which one of the following is a scaled down teaching situation? **[September-2013]**
(a) Macro teaching (b) Team teaching
(c) Cooperative teaching (d) Micro teaching

12. Teacher's role at higher education level is to **[December-2013]**
(a) provide information to students.
(b) promote self learning in students.
(c) encourage healthy competition among students.
(d) help students to solve their problems.

13. The e-content generation for undergraduate courses has been assigned by the Ministry of Human Resource Development to **[June-2014]**
(a) INFLIBNET
(b) Consortium for Educational Communication
(c) National Knowledge Commission
(d) Indira Gandhi National Open University

14. Which one of the following is the best method of teaching? **[June-2014]**
(a) Lecture (b) Discussion
(c) Demonstration (d) Narration

15. Maximum participation of students during teaching is possible through **[December-2014]**
(a) Lecture method (b) Demonstration method
(c) Inductive method (d) Textbook method

16. MOOC stands for **[December-2014]**
(a) Media Online Open Course
(b) Massachusetts Open Online Course
(c) Massive Open Online Course
(d) Myrind Open Online Course

17. Digital Empowerment means **[December-2014]**
(i) Universal digit literacy
(ii) Universal access to all digital resources
(iii) Collaborative digital platform for participative governance.
(iv) Portability of all entitlements for individuals through the Cloud.

Choose the correct answer from the codes given below :
(a) (i) and (ii) only
(b) (ii) and (iii) only
(c) (i), (ii) and (iii) only
(d) (i), (ii), (iii) and (iv)

18. Techniques used by a teacher to teach include : **[June-2015]**
(A) Lecture (B) Interactive lecture
(C) Group work (D) Self study
Select the correct answer from the codes given below:
(a) (A), (B) and (C) (b) (A), (B), (C) and (D)
(c) (B), (C) and (D) (d) (A), (B) and (D)

19. Which combination of methods of teaching is likely to optimise learning? **[August-2016]**
(a) Lecturing, discussions and seminar method
(b) Interactive discussions, planned lectures and PowerPoint based presentations
(c) Interactive lecture sessions followed by buzz sessions, brainstorming and projects
(d) Lecturing, demonstrations and PowerPoint based presentations

20. In which teaching method learner's participation is made optimal and proactive ? **[January-2017]**
(a) Discussion method
(b) Buzz session method
(c) Brainstorming session method
(d) Project method

21. In the two sets given below Set - I indicates methods of teaching while Set - II provides the basic requirements for success/effectiveness. Match the two sets and indicate your answer by choosing from the **code :** **[July-2018]**

Set - I (Method of teaching)
(A) Discussion in groups
(B) Lecturing
(C) Brainstorming
(D) Programmed Instructional procedure

Set - II (Basic requirements for success/effectiveness)
(i) Production of large number of ideas
(ii) Small step presentation with feedback provided
(iii) Content delivery in a lucid language
(iv) Use of teaching-aids
(v) Theme based interaction among partici-pants

Code :

	(A)	(B)	(C)	(D)
(a)	(i)	(ii)	(iii)	(iv)
(b)	(ii)	(iii)	(iv)	(v)
(c)	(iii)	(v)	(ii)	(i)
(d)	(iv)	(ii)	(i)	(iii)

22. Assignment method of teaching is a combination of which of the following? **[December-2018]**
(a) Lecture method and field visit method
(b) Lecture-cum-demonstration method and laboratory method
(c) Project method and lecture method
(d) Heuristic method and problem solving method

23. Heuristic method of teaching was developed by **[December-2018]**
(a) Anne Sullivan (b) Friedrich Forebel
(c) H.E. Armstrong (d) John Dewey

24. SWAYAM refers to: **[20th June 2019-Ist Shift]**
(a) Study World of Action-Learning for Young Aspiring Minds
(b) Study Webs of Active-Learning for Young Aspiring Minds
(c) Student World of Action-Learning for Young Ailing Minds
(d) Study Webs of Active-Learning for Youth Awareness Models

25. Instructions which encourage live participation and interaction through online classes are called: **[20th June 2019-IInd Shift]**
(a) Synchronous instructions
(b) Asynchronous instructions
(c) Traditional instructions
(d) Theoretical instructions

26. Below are given two columns lists Column – A lists methods of teaching and Column - B lists the focus of a method. Match Column - A with Column - B.

[21st June 2019-IInd Shift]

	Column A		Column B
(1)	Lecture method	(i)	Emphasizing the participative procedure of an act
(2)	Demonstration method	(ii)	Experience based learning
(3)	Project method	(iii)	Imparting large amount of knowledge
(4)	Collaborative method	(iv)	Students engage in different activities together and learn

Select your answer from the options given below:
(a) (1)–(i); (2)–(iii), (3)–(ii); (4)–(iv)
(b) (1)–(ii); (2)–(iv); (3)–(i); (4)–(iii)
(c) (1)–(iii); (2)–(i); (3)–(ii); (4)–(iv)
(d) (1)–(iii); (2)–(ii); (3)–(iv); (4)–(i)

27. From the list given below, identify those teaching methods which have a great scope for dialogic discourse.

[21st June 2019-IInd Shift]
(1) Lecture with audio – visual aids
(2) Team teaching
(3) Tutorials
(4) Problem solving methods
(5) Chalk and talk method
(6) Group discussions

Select your answer from the options given below.
(a) (1), (2) and (3) (b) (3), (4) and (6)
(c) (2), (3) and (5) (d) (4), (3) and (6)

28. The introduction of MOOC in open and distance learning programmes is justified because of its

[21st June 2019-IInd Shift]
(a) Low cost considerations
(b) Accessibility considerations
(c) Speed considerations
(d) Novelty considerations

29. "Gyan Darshan" launched by IGNOU refers to which one of the following? **[21st June 2019-IInd Shift]**
(a) Satellite based educational T.V. Channel
(b) Educational FM radio network
(c) Global initiative of Academic networks
(d) Online courses

30. Which of the following instructional designs is part of SWAYAM launched by Government of India?

[21st June 2019-IInd Shift]
(i) E-Tutorial (ii) E-Content
(iii) Assessment (iv) Discussion Forum
(v) Classroom teaching

Choose the correct option from below:
(a) (i) and (ii) only
(b) (i), (iii), (iv) and (v) only
(c) (i), (ii), (iii) and (iv) only
(d) (iii) and (v) only

31. To organize discussion method in teaching effectively, which of the following conditions should be met?

[24th June 2019-Ist Shift]
(1) Topic be easy
(2) Topic be declared in advance
(3) Topic of common interest
(4) Availability of more than one teacher
(5) Language facility of participants

Select appropriate answer from the options given below:
(a) (2), (3) and (5) (b) (1), (2) and (3)
(c) (1), (2) and (5) (d) (3), (4) and (5)

32. The expansion of SANKALP is:

[24th June 2019-IInd Shift]
(a) Sanskrit Awareness and Knowledge Acquisition of Language Programme.
(b) Skills Acquisition and Karatae Awareness for Livelihood Promotion.
(c) Skills Acquisition and Knowledge Awareness for Livelihood Promotion.
(d) Sanskrit Awareness and Knowledge Acquisition for Livelihood Promotion.

33. Below is given a list of teaching methods and approaches. Which among them are individualized approach?

[25th June 2019-Ist Shift]
(1) Demonstration method
(2) Modular approach based teaching
(3) Programmed learning
(4) Personalized teaching
(5) Collaborative method

Select your answer from the options given below:
(a) (1), (2) and (3) (b) (2), (3) and (4)
(c) (3), (4) and (5) (d) (1), (3) and (5)

34. The methods of learning in Higher Education in India in the past consisted of **[25th June 2019-Ist Shift]**
(a) Memorization, Brain Storming procedure and Seminar
(b) Memorization, Critical Analysis and Story telling
(c) Critical Analysis, Assignment Writing and Oral reports
(d) Story Telling, Brain storming procedure and Seminar

35. Which of the strategies in the list given below will be associated with direct teaching?

[26th June 2019-Ist Shift]
(i) Providing examples and explanation
(ii) Promoting inquiry
(iii) Focusing on concepts
(iv) Giving review and recapitulation
(v) Offering practice and feedback
(vi) Problem raising and problem-solving

Choose the correct answer from the options given below:
(a) (i), (ii) and (iii) (b) (ii), (iii) and (iv)
(c) (i), (iv) and (v) (d) (iv), (v) and (vi)

36. Which of the following is an online store house of all academic awards like certificates, diplomas, degrees, mark sheets etc.? **[26th June 2019-Ist Shift]**
(a) SWAYAM
(b) National Digital Library
(c) National Academic Library
(d) National Academic Depository

37. Below are given two Columns. Column-A presents the methods of teaching and Column-B presents the focus of a method. Match the two Columns.

[26th June 2019-IInd Shift]

	Column-A (Methods of Teaching)		**Column-B (Focus of a method)**
1.	Collaborative Method	(i)	When expertise of teachers are used in teaching
2.	Co-operative Method	(ii)	When emphasis is given on students as creator of knowledge
3.	Constructivist Method	(iii)	When students share different aspects of a learning activity
4.	Team teaching	(iv)	When students help each other to learn

Select your answer from the options given below:

	(1)	(2)	(3)	(4)
(a)	(i)	(ii)	(iii)	(iv)
(b)	(iii)	(iv)	(ii)	(i)
(c)	(iv)	(iii)	(ii)	(i)
(d)	(ii)	(iv)	(iii)	(i)

38. What is SWAYAM? **[26th June 2019-IInd Shift]**

(a) Non-Governmental Organisation
(b) Digital Programme to achieve the principles of education
(c) On-line platform
(d) Name of a website

39. In the following list, which belong to the category of learner-centred approaches? **[2nd Dec. 2019-Ist Shift]**

(i) SWAYAM
(ii) Computer-aided instruction
(iii) MOOCS
(iv) Quizzes
(v) Buzz-sessions

Select the correct answer from the options given below :

(a) (i) and (iii) (b) (ii) and (iii)
(c) (ii) and (iv) (d) (iii) and (v)

40. Which items in the following constitute the non-conventional learning programmes? **[2nd Dec. 2019-Ist Shift]**

(i) Tea sommelier
(ii) Oriental languages
(iii) Spa management
(iv) Museology
(v) Comparative languages

Select the correct answer from the options given below:

(a) (i), (ii) and (iv) (b) (ii), (iii) and (v)
(c) (i), (iii) and (iv) (d) (ii), (iv) and (v)

41. Which of the following is a 'Decision Support system' for assisting people in taking best decisions for their children's future'? **[2nd Dec. 2019-Ist Shift]**

(a) E-Pathshala (b) Saransh
(c) Shaala Sidhdhi (d) SWAYAM PRABHA

42. In the spectrum of teaching methods which of the following will be called 'dialogic'? **[3rd Dec. 2019-Ist Shift]**

(A) Demonstration method
(B) Problem-solving method
(C) Chalk and talk method
(D) Team teaching based method
(E) Interactive presentation
(F) Tutorials

Select your answer from the options given below:

(a) (A), (B) and (C) (b) (B), (C) and (D)
(c) (C), (D) and (E) (d) (B), (E) and (F)

43. Which of the following sequences depicts outcome based curriculum design for college level teaching programmes? **[3rd Dec. 2019-IInd Shift]**

(a) Content, teaching-learning, learning outcomes, evaluation
(b) Desired learning outcomes, content, teaching-learning, assessment and evaluation
(c) Teaching-learning, content, learning outcomes, assessment and evaluation
(d) Content, desired, learning outcomes teaching-learning. evaluation and assessment

44. Which of the following teaching method(s) is/are contributive to direct learning? **[6th Dec. 2019-Ist Shift]**

A. Team teaching and lecturing
B. Simulation and role playing
C. Lecture with or without use of audio- visuals
D. Participation in workshop and assignments
E. MOOCs and heuristics
F. Interactive presentation

Choose your answer from the following options:

(a) (B), (D) and (E) (b) (A), (B) and (C)
(c) (C), (D) and (F) (d) (D), (E) and (F)

45. Which among the following is a Massive Open Online Course Platform created by the Ministry of Human Resource Development, Government of India? **[6th Dec. 2019-IInd Shift]**

(a) PRATHAM (b) SWAYAM
(c) FUTURE LEARN (d) OPEN LEARN

46. Identify the sequence which correctly indicates the order for ensuring teaching-learning activities in a constructivist approach **[6th Dec. 2019-IInd Shift]**

(a) Explore, Explain, Engage, Extend and Evaluate
(b) Evaluate, Extend, Engage, Explain and Explore
(c) Explain, Engage, Explore, Evaluate and Extend
(d) Engage, Explore, Explain, Evaluate and Extend

47. Given below are two statements - one is labelled as Assertion (A) and the other is labelled as Reason (R):

[4th Dec. 2019-IInd Shift]

Assertion (A): Through on-line teaching a large number of students can be taught by very competent faculty.

Reason (R): On-line teaching helps students in developing critical thinking more than the Off - line teaching can do.

In the light of the above two statements choose the correct option :

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(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true and (R) is not the correct explanation of (A)
(c) (A) is true, but (R) is false
(d) (A) is false, but (R) is true

48. Match List - I with List - II **[4th Dec. 2019-IInd Shift]**

List I (Digital Initative)	**List II (Purpose)**
(A) UMANG	(i) G213 Services
(B) BHIM	(ii) Learning platform
(C) eBiz	(iii) Unified payment interface
(D) SWAYAM	(iv) Single point of access to all government services.

Choose the correct option from those given below :
(a) (A)-(ii), (B)-(i), (C)-(iii), (D)-(iv)
(b) (A)-(iii), (B)-(ii), (C)-(iv), (D)-(i)
(c) (A)-(iv), (B)-(iii), (C)-(i), (D)-(ii)
(d) (A)-(i), (B)-(iv), (C)-(ii), (D)-(iii)

49. Match List-I with List-II **[5th Dec. 2019 (Second Shift)]**

List I (Digital Initiatives)	**List II (Purpose)**
(A) SWAYAM	(i) Integrated Library Management software
(B) Spoken Tutorial	(ii) Robotics competition
(C) e-Granthalaya	(iii) Promotes IT literacy through open source Software
(D) e-Yantra	(iv) Personalized and adaptive learning

Choose the correct option from those given below:
(a) (A)-(i), (B)-(iv), (C)-(ii), (D)-(iii)
(b) (A)-(ii), (B)-(i), (C)-(iii)- (D)-(iv)
(c) (A)-(iii), (B)-(ii), (C)-(iv), (D)-(i)
(d) (A)-(iv), (B)-(iii),(C)-(i), (D)-(ii)

50. Below are given two sets in which set I species the four behaviour modication techniques while set II indicates their exemplication. Match the two sets **[6th Dec. 2019-Ist Shift]**

Set I (Behaviour modication techniques)	**Set II (Example)**
(A) Positive reinforcement	i. Withdrawal of a pleasant stimulus or application of an aversive stimulus to stop the behaviour
(B) Negative reinforcement	ii. Painful or aversive stimulus is presented to stop the occurrence of behaviour
(C) Punishment	iii. The behaviour increases in frequency after the removal of the stimulus
(D) Extinction	iv. The behaviour increases in frequency after the presentation of a stimulus

Choose your answer from the following options:
(a) (A)-(i), (B)-(ii),(C)-(iii),(D)-(iv)
(b) (A)-(ii), (B)-(i), (C)-(iii),(D)-(iv)
(c) (A)-(iv),(B)-(iii),(C)-(ii),(D)-(i)
(d) (A)-(iii),(B)-(i),(C)-(ii),(D)-(iv)

51. In the context of classroom teaching, the foundation on which a warm and nurturing relationship with learners can be built is called: **[2nd Dec. 2019-IInd Shift]**
(a) Probing (b) Teacher Affect
(c) Structuring (d) Feedback

HINTS & EXPLANATION

1. (c) The advantages of Discussion method are that it increases students' interest, involvement, acceptance and commitment; utilises their knowledge and experience; and effects permanent learning because of student participation. So, it is the preferred method when the topic is difficult.

2. (c) Team teaching involves a group of 2 to 5 instructors teaching the same group of students, cooperatively on a regular basis. Teams can be single-discipline, interdisciplinary, or school-within-a-school teams that meet with a common set of students over an extended period of time. Different personalities, voices, values, and approaches spark interest, keep attention, and prevent boredom. Faculty evaluate students on their achievement of the learning goals; students evaluate faculty members on their teaching proficiency. The team-teaching approach allows for more interaction between teachers and students. It fosters among teachers the habit of supplementing the teaching of one another.

3. (b) Problem-solving, Self-study as well as Team teaching can be limited to paper pen, sitting at a desk. Laboratory method, on the other hand, involves hands on experience with original or raw data/ materials/ facts derived from investigations or experimentation for the solution of problem. It happens in the psychomotor domain that involves at least four senses—sight, hearing, smell and touch.

4. (a) Lecture method is one way communication flow from the active teacher to the passive taught. It develops knowledge gained from passive listening but doesn't allow thinking or reasoning to the listeners.

5. (a) Discussion method involves open-ended, collaborative exchange of ideas in the classroom serving the objective of triggering students' thinking and enhancing their learning and problem solving. So, it involves the maximum participation of students. Lecture, audio-visual, and textbook methods keeps students passive.

6. (a) Micro-teaching is a teacher training technique that helps the student-teacher to practise specific teaching skills and teaching behaviours and learn the art of teaching at ease under controlled conditions to gain real-time teaching experiences. It reduces the complexities of the teaching situation in terms of number of students, duration of the class and the content to be taught; and concentrates on mastery of only one skill at a time.

7. (d) A group discussion is more interactive and student centric.

8. (b) Micro-teaching is a teacher training and faculty development technique whereby the teacher reviews a recording of a teaching session, in order to get constructive feedback from peers and/or students about what has worked and what improvements can be made to their teaching technique.

9. (d) The best outcome of teaching is achieved through a two-way interactive communication with a full-hearted participation from all. So, the teacher initiating a discussion and participating in it is the best method of teaching. Options A, B and C do not guarantee students full attention, motivation or involvement.

10. (c) Demonstration is a participative teaching method used to communicate an idea of making or doing something through the use of visual aids such as posters, charts, power point, etc. This method ensures greater understanding of complex skills and principles and makes learning permanent by involving the learners' psychomotor skills; develops interest and motivation for active participation of learners; raises the self-confidence and leadership skill in the demonstrator. Maximum time is utilised as students grasp faster by watching the demonstration how to apply theoretical knowledge practically.

Lecture is a one-way or non-participative communication, hence not too productive while discussion and question-answer methods are less productive than Demonstration because neither involves psychomotor domain of learning.

11. (d) Microteaching is a scaled-down, simulated teaching activity formulated as a teacher training or faculty development technique. It can be practised with a very small lesson or a single concept and a less number of students. It scales down the complexities of real teaching, as immediate feedback can be sought after each practice session. A recorded teaching session may be reviewed by peers and/or students and constructive feedback about what worked and what improvements could be made to the teaching technique be sought. Micro teaching focuses on sharpening and developing specific teaching skills and eliminating mistakes.

Macro teaching is often done in lecture format, and may be used to introduce a new concept, such as adding, or to practice a new skill, such as sounding out new words. Another component ofmacro teaching occurs when a teacher is developing lesson plans.

Team teaching involves a group of instructors working together on a regular basis for the purpose of helping a group of students of any age learn. Teachers together set goals for a course, design a syllabus, prepare individual lesson plans, teach students, and evaluate the results. They share insights, argue with one another, and perhaps even challenge students to decide which approach is better. Co-teaching involves two educational professionals working together to teach a group of heterogeneous learners. The most common teams of educators found to engage in co-teaching relationships are paraprofessionals, speech/language pathologists, etc.

12. (b) promote self learning in students. In the age of information technology, computers have overtaken teachers as the expert repositories of subject wisdom which can be acquired at home or in a resource centre rather than at an institution of higher education. So, teachers today play the role of 'managers of learning' rather than 'dispensers of knowledge'; and as flexible generalists who can promote self learning in students and help them cope with the complexity of learning in an Information Society.

13. (b) CEC or Consortium for Educational Communication is one of the Inter University Centres set up by the University Grants Commission of India. It has been established with the goal of addressing the needs of Higher Education through the use of powerful medium of Television along with the appropriate use of emerging Information Communication Technology (ICT).

INFLIBNET or Information and Library Network Centre, Gandhinagar is an Autonomous Inter-University Centre (IUC) of University Grants Commission (UGC) headquartered at Gujarat University Campus, Ahmedabad.

The Indira Gandhi National Open University (IGNOU), established by an Act of Parliament in 1985, has continuously striven to build an inclusive knowledge society through inclusive education. It has tried to increase the Gross Enrolment Ratio (GER) by offering high-quality teaching through the Open and Distance Learning (ODL) mode.

The National Knowledge Commission (NKC) was a high-level advisory body to the Prime Minister of India, constituted for a three and a half year term with the objective of transforming India into a knowledge society. The implementation of the NKC's recommendations are currently underway at the Central and State levels.

14. (c) This method ensures greater understanding of complex skills and principles and makes learning permanent by involving the learners' psychomotor skills; develops interest and motivation for active participation of learners; raises the self-confidence and leadership skill in the demonstrator.

Maximum time is utilised as students grasp faster by watching the demonstration how to apply theoretical knowledge practically.

15. (b) In the inductive method, the teacher makes students 'detect or notice patterns' and work out a 'rule' for themselves. In other words, instead of explaining a given concept and following this explanation with examples, the teacher presents students with many examples showing how the concept is used and lets them figure out the concept/idea/rule. So, maximum participation of students is ensured.
All the other three methods are teacher-centric where students are passive receivers of information.

16. (c) A massive open online course (MOOC) is an online course aimed at unlimited participation and open access via the web.

17. (d) As per the Press Information Bureau, Government of India, Cabinet release on 20 August, 2014, the 'Digital India' programme envisions the following under the vision area of **Digital Empowerment of Citizens:**
(i) Universal digital literacy.
(ii) All digital resources universally accessible.
(iii) All Government documents/ certificates to be available on the Cloud.
(iv) Availability of digital resources / services in Indian languages.
(v) Collaborative digital platforms for participative governance.
(vi) Portability of all entitlements for individuals through the Cloud.

18. (a) (A), (B) and (C)
Techniques used by a teacher to teach include Lecture, Interactive lecture, Group work, etc. Self-study is for the knowledge enhancement of the self; not for teaching.

19. (c) Among all methods, interactive teaching and one that involves psychomotor domain of learning has been proved most effective in achieving instructional objectives. Option C gives a combination of processes which involve either or both of these.

20. (d) In project method, learners are at the centre of the learning process. Well designed project-based experiences engage learners in open-ended, authentic tasks. Compelling project tasks empower learners to make decisions and apply their interests and passions to culminating products and performances. Learners learn through inquiry and have some control over decisions about how they complete project tasks. This method is based on the philosophy of Pragmatism and the principle of 'Learning by doing'. The teacher takes on the role of a facilitator or coach. Learners often work in collaborative groups, assuming roles that make best use of their individual talents.
Discussion methods are a variety of forums for open-ended, collaborative exchange of ideas among a teacher and students or among students for the purpose of furthering students thinking, learning, problem solving, understanding, or literary appreciation. This method involves optimal participation of students but not proactive.
Buzz sessions are short participative sessions that are deliberately built into a lecture or larger group exercise in order to stimulate discussion and provide student feedback.
Brainstorming is a group creativity technique by which efforts are made to find a conclusion for a specific problem by gathering a list of ideas spontaneously contributed by its members.

21. (c) (A-iii) (B-v) (C-ii) (D-i)
Lecture is a one-way method where learners are passive listeners. Hence, content delivery in a lucid language is essential for desired learning to take place. Discussion in groups has to be centred on the theme with active participation of participants for best outcome. Brainstorming is aimed at pooling of maximum possible ideas generated by the members of the group. Programmed instruction is not limited to use of teaching aids; its basic principle is step wise instruction based on feedback after every step.

22. (b) Lecture-cum-demonstration method and laboratory method
Assignment method includes the teacher's lecture on the topic and demonstration of the work expected from the students. Students then collect data, investigate and experiment with them to solve the given problem.

23. (c) H E Amstrong
THE **HEURISTIC METHOD OF TEACHING** written by *HENRY E. ARMSTRONG* was first published in January 1902.
It proposes a "problem solving" approach using logical and imaginative thinking based on the "trial and error" theory.

24. (b) The acronym 'SWAYAM' stands for 'Study Webs of Active Learning for Young Aspiring Minds' . SWAYAM is the indigenous platform of the MHRD, GOI providing an integrated portal and platform for hosting Massive open online courses (MOOCS) developed under the aegis of 'The National Mission on Education through Information and Communication Technology (NMEICT)'.

25. (a) The modern day e-learning environment can be synchronous or asynchronous. Synchronous e-learning involves online studies in a virtual classroom where students and teachers interact instantly and synchronously through instant messaging and videoconferencing.
Asynchronous learning is offline and involves coursework delivered via web, email and message boards posted on online forums which individuals may access as per their convenience.

26. (d) 1-iii, 2-ii, 3-iv, 4-i
Lecture method is teacher- centred where students are passive but the teacher also asks questions to keep the students attentive. It is economical, saves time and also covers syllabus, so, is used to teach large number of students.
Demonstration method is experience-based where the teacher communicates an idea or teaches something in a step-by-step demonstration with the aid of visuals such as flip charts, posters, power point, etc.
Project Method is student-based where students engage in various activities together and solve a practical problem over a period of several days or weeks. It may involve building a rocket, designing a playground, or publishing a class newspaper.
Collaborative method involves students working together in groups for common learning goals. It emphasizes the participative procedure of an act guided

by the theory that knowledge is a social construct, and contextually relevant educational experiences involving social exchange lead to deeper learning.

27. (b) Authoritative discourse consists in monologic communication. In the classroom, it happens in the form of lectures, recitation, activities and the completion of textbook or worksheet activities. In these activities what comes to count as knowledge is based on 'right' or 'wrong' answers.

Dialogic discourse comprises more conversational communication. In the classroom, this may involve comparison and creation of ideas. It is open to different perspectives and seeks no fixed answers. It encourages participants to acknowledge and understand the perspective of others.

The teaching methods which have a great scope for dialogic discourse are **tutorials**— self-paced instructional program providing step by step information on a concept or learning unit; **problem solving**— an ongoing activity to discover what is not known; and, **group discussion**— systematic exchange of information, views and opinions about a topic, problem, issue or situation among the members of a group who share some common objective.

28. (b) A MOOC (Massive Open Online Course) is **web-based platform which provides unlimited number of students worldwide with a chance of distance education with the best institutes in the world**. It was established back in 2008 and gained momentum in 2012 as a popular learning tool.

The University Grants Commission (UGC) along with the HRD (Human Resource Development) Ministry has launched the program in India for higher secondary, bachelors and masters degrees. Now a student can pursue any courses through this program with internet access from their room.

29. (a) Gyandarshan is a state owned television channel telecasting from Doordarshan, Kendra, IGNOU. It is an educational channel which carries programmes on IGNOU's courses, general awareness programmes, and interactive sessions with subject experts and scholars besides promoting nationalism, harmony and peace. The channel is available free of cost and it is a "must carry channel for all Cable/TV/ DTH and IPTV operators. Its down link frequency is 3831 MHz with LNB frequency 5150 MHz and the symbol rate is 7200 SPS with vertical polarity.

30. (c) SWAYAM is a program initiated by Government of India and designed to achieve the three cardinal principles of Education Policy viz., access, equity and quality. The program is done through a platform that facilitates hosting of all the courses, taught in classrooms from Class 9 till post-graduation to be accessed by anyone, anywhere at any time. The courses hosted on SWAYAM are in 4 quadrants – (1) video lecture, (2) specially prepared reading material that can be downloaded/printed (3) self-assessment tests through tests and quizzes and (4) an online discussion forum for clearing the doubts.

31. (a) The topic need not be easy but must be declared in advance to frame a groundwork and build familiarity with it. The topic must be of common interest to ensure optimal participation and minimise distraction. Students' natural ability in the language/ medium of discussion facilitates the desired outcomes.

32. (c) Skills Acquisition and Knowledge Awareness for Livelihood Promotion (SANKALP) project aims to implement the mandate of the National Skill Development Mission (NSDM), which was launched on 15th July by Ministry of Skill Development & Entrepreneurship, through its core sub-missions.

33. (b) Modular approach involves modules of topical content prepared for **individual** self- instruction and allows the learner complete control over learning.

Programmed learning is a systematic instructional strategy for self-learning based on Skinner's theory of operant conditioning where the lesson is structured into small graded steps with immediate reinforcement for the **individual** learner.

Personalised teaching constitutes in customising the curriculum, teaching style and learning environment to cater to the specific requirement/aptitude/target of each learner **individually**.

Collaborative method involves a **team** of teachers/ students collaborating to transact/learn a lesson; while Demonstration is a planned activity using demonstrating skills, principles, and theory with the aid of performance or visual presentation for the learners.

34. (b) Ancient Indian Education was for a long time imparted through the oral lesson, without the medium of a book. Oral recitation was the basic medium of imparting knowledge and was practiced through various methods like introspection (listening, contemplation and concentrated contemplation), storytelling, memorization, critical analysis, practical study and seminars.

35. (c) Direct teaching is a teacher-directed method (teacher facing and instructing a class)with the use of straightforward, explicit teaching techniques to teach a specific lesson or skill.

Therefore, providing examples and explanation (i); giving review and recapitulation (iv); and offering practice and feedback are strategies of direct teaching method.

Promoting inquiry (ii); focussing on concepts (iii); and offering practice and feedback (v) are student centred methods of teaching.

36. (d) "National Academic Depository (NAD)" is a National System set-up by Ministry of Human Resources Development and University Grants Commission by appointing NSDL Database Management Limited (NDML). It is a 24×7 online store house of all academic awards viz. certificates, diplomas, degrees, mark-sheets etc. duly digitised and lodged by academic institutions / boards / eligibility assessment bodies. NAD not only ensures easy access to and retrieval of an academic award but also validates and guarantees its authenticity and safe storage.

37. (b) (1)-(iii); (2)-(iv); (3)-(ii); (4)- (i)

In Collaborative Method, students share different aspects of a learning activity; in Cooperative, they help each other to learn; in Constructivist, they create knowledge; and, in Team Teaching, teachers with different types of expertise collaborate as a team to enhance teaching.

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38. (b) SWAYAM (Study Webs of Active–Learning for Young Aspiring Minds) is designed to achieve the three cardinal principles of Education Policy viz., access, equity and quality. It seeks to bridge the digital divide for students who have hitherto remained untouched by the digital revolution and have not been able to join the mainstream of the knowledge economy.

39. (a) SWAYAM or Study Webs of Active Learning for Young Aspiring Minds is a programme of the Ministry of Human Resource Development, Government of India; and MOOCs or Massive Open Online Courses (MOOCs) are free online courses available for anyone to enrol. Both are learner-centred methods without the involvement of any instructor, as such. On the other hand, computer-aided instruction, Quizzes and Buzz-sessions etc., are conducted/delivered/instructed by another person to the learners.

40. (c) **Oriental** and **Comparative languages** have been conventional domains of learning.
The other three given are new courses of learning:
Tea Sommelier is an eight module professional course to become a tea connoisseur.
Spa Management courses and training programs are degree or certificate programs to become qualified for running/managing a spa.
Museology is a professional course to become qualified for organizing, arranging, and managing museums.

41. (b) India Development Gateway (InDG) has developed a portal named 'SARANSH' that would work as decision support system for assisting people in taking decisions for their children's future. Saransh will work as a tool for comprehensive self-review and analysis for CBSE affiliated schools and parents. It enables them to analyze students' performance in order to take remedial measures. Saransh brings schools, teachers and parents closer, so that they can monitor the progress of students and help them improve their performance.

42. (d) Dialogic method involves verbal exchange between the teacher and the taught. So, problem solving method, interactive presentation and tutorials are dialogic.

43. (b) Outcome-Based Education (OBE) is a student-centric teaching and learning methodology in which the course delivery, assessment are planned to achieve stated objectives and outcomes. It focuses on measuring student performance, i.e. outcomes at different levels. The sequence of outcome based curriculum design at college level teaching programmes is definition of desired learning outcomes, designing content in line with those, carrying out the process of teaching-learning, conducting the assessment and evaluation.

44. (a) Direct learning implies gaining knowledge straight from the source, without any mediation or intervention from the teacher or any other person. This is possible through the practical approaches that provide hands-on experience or learning by doing. Simulation and role playing, Participation in workshop and assignments, MOOCs (Massive Open Online Courses) and heuristics (self-discovery) all provide practical, hands-on direct learning without teacher intervention.

45. (b) SWAYAM is India's national Massive Open Online Course (MOOC) platform, designed to achieve the three cardinal principles of India's Education Policy: access, equity and quality.

46. (d) The Contructivist approach refers to the learner actively constructing or discovering their own knowledge and reality being determined by the experiences of the learner. The learner engages the self into the learning activity, explores the truth, is able to explain by understanding and then evaluate the learning that has happened, and finally extends the knowledge gained to further learning goals.
So , the sequence of teaching-learning activist in this approach is: Engage, explore, explain, evaluate, extend.

47. (c) Online teaching refers to the presentation and learning of courses over the Internet through the explicit use of technology and computer networking systems. Courses can be designed for a handful of enrolled students or can be made open and accessible to a wide variety of participants, such as with a MOOC (Massive Open Online Course). So, Assertion (A) is true. However, only the mode of delivery of the course is different here. There is no difference in the learning gains made by the learner as compared to the conventional classroom mode. So, Reason (R) is false.

48. (c)

49. (d) SWAYAM (Study Webs of Active–Learning for Young Aspiring Minds) is a programme initiated by Government of India with the objective to take the best teaching learning resources to all, including the most disadvantaged. This is done through a platform that facilitates hosting of all the courses, taught in classrooms from Class 9 till post-graduation to be accessed by anyone, anywhere at any time.
The Spoken Tutorial project is about teaching and learning particular FLOSS (Free/Libre and Open Source Software) like Linux, Scilab, LaTeX, PHP & MySQL, Java, C/C++, LibreOffice etc.
e-Granthalaya is a Digital Platform developed by National Informatics Centre, Ministry of Electronics and Information Technology, Government of India. On this platform, NIC provides a complete ICT solution with integrated Library Management Software, Digital Library Module, Cloud hosting environment and a Library Portal (OPAC) with NICSI empaneled Roll-out Services and support.
IIT Bombay envisages the '*e-Yantra*' platform to harness the intellectual talent of young India to create utility based robotic applications for usage across variety of applications such as: agriculture, manufacturing, defense, home, and city maintenance and services industries.

50. (c) Positive reinforcement—The behaviour increases in frequency after the presentation of a stimulus
Negative reinforcement—The behaviour increases in frequency after the removal of the stimulus
Punishment—Painful or aversive stimulus is presented to stop the occurrence of behaviour
Extinction—Withdrawal of a pleasant stimulus or application of an aversive stimulus to stop the behaviour

51. (b) A positive, warm and nurturing relationship can be built with the learners only when the teacher's 'affect' or emotional fibre is conducive and s/he uses it optimally for the purpose.

CHAPTER 5

Teaching Support System

TEACHING SUPPORT SYSTEM

Teaching Support system is a set of tools that will improve student achievement by building capacity in teachers.

I. TRADITIONAL TEACHING SUPPORT SYSTEM

In the traditional way of teaching and learning, higher education institutions designed a program based on the **text book** and **lecture** which is framed with time and place for students. In this model, the main purpose is to satisfy requirement for mastery of a body of knowledge for a life long career. School teaching is supported by **textbook** and **chalk and blackboard** in traditional method.

Merits and Demerits of Traditional Teaching Methods

Merits	Demerits
Lecture remains one of the most effective teaching methods when the group of learners is exceptionally huge.	There is less involvement of learners.
Traditional teaching methods are easy to use given any group of learners.	There is less emphasis on the understanding of concepts and/or logical thinking.
They are economic in terms of money as well as time.	Weak learners suffer the most as they don't feel motivated.
The teacher has a lot of authority over how the content is delivered and the amount of creativity involved.	Evaluation of learners based on traditional teaching methods can sometimes be faulty.
	There is less incentive among teachers for reflection.

Traditional Methods of Teaching in a Nutshell

- Teacher-centric classrooms
- Teachers in the mode of knowledge dispensers rather than facilitators
- Chalk and talk methods
- Regimented classrooms
- Lack of collaboration and group learning
- More emphasis on examinations and results rather than understanding of concepts
- Improper alignment between objectives, activities and assessments

II. MODERN TEACHING SUPPORT SYSTEM

The changes in modern teaching methods made necessary by technological, economic, and cultural forces in the early 21st century have fundamentally altered the very foundation of traditional educational models. Education reforms mean that learning is taught from a completely different angle.

Merits and Demerits of ModernTeaching Methods	
Merits	**Demerits**
• They are learner-centred techniques.	• Since teaching becomes more dynamic, teachers need to learn and relearn new skills.
• More content can be covered in lesser time.	• There is too much reliance on technology which reduces the authority of teachers.
• Modern teaching methods are fun and interactive way of learning.	• It requires huge investment of money, time and effort.
• There is more scope for using audio-video teaching aids such as documentaries, YouTube videos, online lectures, MOOCs, educational games, educational mobile applications etc.	• Some modern teaching methods are exclusionary in nature.
• Modern teaching methods also help in self-evaluation.	• The teacher-student relationship suffers as there is less time to develop bonding with the students.
• It is not a mechanical way of teaching as students, as well as teachers, participate in knowledge construction.	

Modern methods education in a nutshell

- Technology-driven classrooms
- Continuous comprehensive evaluation
- Cross-curricular connections
- Inquiry-based learning
- Emphasis on understanding of concepts
- Linking curriculum with life
- Emphasis on skill building, life skills and values
- Smart interactive boards

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- BYOD – Bring your own device
- Collaborative learning
- Differential learning
- Activity-based learning and learning labs
- Interdisciplinary learning
- Integrative and social responsibility and civic engagement
- Digitisation in teaching, learning assessment and feedback
- Collaborative learning
- Differentiated instruction
- Flipped classroom
- Problem-based learning

III. ICT BASED TEACHING SUPPORT SYSTEM

Computer technology has become a service provider, teaching partner, and learning tool; and Indian universities are now using Information Communication Technologies (ICT) for various purposes. This has created a new scenario of modes of education which can be classifies as follows :

1. Formal Education	Classroom / campus based education imparted by traditional universities.
2. Non-formal-Open and Distance Education:	Offered by single mode open universities.
3. Mixed Mode Education	Offered by Distance Education Institutions (DEI) of traditional universities by using both formal and non-formal components of the two modes.
4. ICT Based Convergent Mode	Uses Web Based Education (WBE), Computer Based Education, Center/ Classroom Based Education. Some universities are using ICT and Internet extensively in education to supplement the print based / classroom based mode in formal and/ or non-formal education.
5. Entirely WBE - E-Education	Uses Internet and WBE extensively so that teaching and learning is almost distributed.

Nature and Characteristics of ICT Based Teaching Support System

- Information and Communication Technology can lead to improved student learning and better teaching methods. with often larger classes, more diverse students, demands from government and employers who want more accountability.
- Conventionally, materials to support teaching learning were of two types; visuals in the form of charts, posters, photographs and models or actual objects.
- With the advent of projection devices like the overhead projectors and audio-visual devices like radio, television, tape recorders, the range of support materials grew.
- With the advent of computers with superior graphic capabilities and adequate computing power to play back audio and video, a diverse set of devices have become integrated.
- A large number of audiovisual support in the form of graphics, animation, models, drawings, photographs, audio and video have been developed.
- Simultaneously, internet enables the development of large networks, which can cater to a diverse set of needs of the school system.

Mega Paradigm Shifts in Education

There are mainly two mega paradigm shifts in education.

- The first is from traditional university to open and distance education (ODE), and the second is from ODE to E-Education.
- Both the traditional and ODE universities are essentially based on industrial models of education – offering mass education.

Teaching Aids

Teaching aids may be classified as follows:

Visual Aids: The aids which use sense of vision are called Visual aids; e.g., actual objects, models, pictures, charts, maps, flash cards, flannel board, bulletin board, chalkboard, overhead projector, slides etc. Out of these black board and chalk are the commonest ones.

Audio Aids: The aids that involve the sense of hearing are called Audio aids; e.g., radio, tape recorder, gramophone, etc.

Audio-Visual Aids: The aids which involve the sense of vision as well as hearing are called Audio- Visual aids; e.g., television, film projector, film strips, etc.

Projected and Non-projected Aids

Projected aids	**Non-projected aids**				
	Graphic aids	**Display boards**	**3-D**	**Audio aids**	**Activity aids**
Films	Charts	Blackboard	Models	Radio	Field trips
Slides	Flash cards	White board	Mock ups	Recordings	Experimentation
Overhead	Posters	Bulletin board	Objects and specimens	Digital Audio Player	Dramatics
Epidiascope	Pictures and photographs	Flannel board	Puppets	Television	Teaching machines
Video projectors	Graphs	Magnetic board		Telephone and mobile	Programmed instructions
Flim strips	Maps Diagrams	Peg board			

Importance of Teaching Aids

i. **Motivation:** Teaching aids motivate the students so that they can learn better.

ii. **Clarification:** Through teaching aids, the teacher clarifies the subject matter more easily.

iii **Discouragement of Cramming:** Teaching aids can facilitate the proper understanding to the students which discourage the act of cramming.

iv. **Increase the Vocabulary:** Teaching aids helps to increase the vocabulary of the students more effectively.

v **Direct Experience:** Teaching aids provide direct experience to the students

vi. **Classroom Live and Active:** Teaching aids make the classroom live and active.

vii. **Saves Time and Money**

viii **Avoids Dullness**

EXERCISE

1. Which of the following is a teaching aid? **[December-2004]**
(a) Working Model of Wind Mill
(b) Tape Recorder
(c) 16 mm Film Projector
(d) All the above

2. Listening to the lecture delivered by the teachers in the classroom is **[June-2005]**
(a) Informative audition (b) Assessed audition
(c) Added audition (d) None of the choices

3. Which of the following is not an instructional material? **[December-2006]**
(a) Over Head Projector (b) Audio Casset
(c) Printed Material (d) Transparency

4. Why do teachers use teaching aid? **[June-2009]**
(a) To make teaching fun-filled
(b) To teach within understanding level of students
(c) For students' attention
(d) To make students attentive

5. An effective teaching aid is one which **[June-2011]**
(a) is colourful and good looking
(b) activates all faculties
(c) is visible to all students
(d) easy to prepare and use

6. Which of the following belongs to a projected aid ? **[December-2011]**
(a) Blackboard (b) Diorama
(c) Epidiascope (d) Globe

7. Which of the following does not belong to a projected aid ? **[June-2012]**
(a) Overhead projector (b) Blackboard
(c) Epidiascope (d) Slide projector

8. For a teacher, which of the following methods would be correct for writing on the blackboard? **[June-2012]**
(a) Writing fast and as clearly as possible.
(b) Writing the matter first and then asking students to read it.
(c) Asking a question to students and then writing the answer as stated by them.
(d) Writing the important points as clearly as possible.

9. The black-board can be utilised best by a teacher for **[June-2013]**
(a) putting the matter of teaching in black and white
(b) making the students attentive
(c) writing the important and notable points
(d) highlighting the teacher himself

10. ''A diagram speaks more than 1000 words.'' The statement means that the teacher should **[June-2013]**
(a) use diagrams in teaching.
(b) speak more and more in the class.
(c) use teaching aids in the class.
(d) not speak too much in the class.

11. A smart classroom is a teaching space which has **[December-2014]**
(i) Smart portion with a touch panel control system.
(ii) PC/Laptop connection and DVD/VCR player.
(iii) Document camera and specialized software
(iv) Projector and screen
Select the correct answer from the codes given below:
(a) (i) and (ii) only (b) (ii) and (iv) only
(c) (i), (ii) and (iii) only (d) (i), (ii), (iii) and (iv)

12. Instructional aids are used by the teacher to **[December-2014]**
(a) Glorify the class (b) Attract the students
(c) Clarify the concepts (d) Ensure discipline

13. Which of the following statements about teaching aids are correct? **[June-2015]**
(A) They help in retaining concepts for longer duration.
(B) They help students learn better.
(C) They make teaching learning process interesting.
(D) They enhance rote learning.
Select the correct answer from the codes given below:
(a) (A), (B), (C) and (D) (b) (A), (B) and (C)
(c) (B), (C) and (D) (d) (A), (B) and (D)

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14. For advancing knowledge, the latest strategy used by mankind is **[August-2016]**

(a) consulting an authority (b) deductive reasoning
(c) scientific thinking (d) inductive reasoning

15. The use of teaching aids is justified on the grounds of **[July-2016]**

(a) attracting students' attention in the class room.
(b) minimising indiscipline problems in the classroom.
(c) optimising learning outcomes of students.
(d) effective engagement of students in learning tasks.

16. There are some best practices of using teaching aids in classroom. Below are given certain teaching media aids, please match them according to the size of the class in terms of number of students and the teaching aid to be used: **[December-2018]**

Set-I	**Set-II**
(A) Small size of 2-3 students	(i) Flip-chart or white board
(B) Medium size class of 10-15 students	(ii) PowerPoint slides
(C) Large size class of 20-25 students	(iii) Oval presentation with display screen
(D) Extra large size class of more than 30 students	(iv) Writing on paper

Code:

(a) A-(ii); B-(iii); C-(iv); D-(i)
(b) A-(i); B-(iv); C-(ii); D-(iii)
(c) A-(iv); B-(i); C-(ii); D-(iii)
(d) A-(i); B-(iv); C-(iii); D-(ii)

17. There are teaching aids which are centered around certain skills such as reading, listening and pronunciation etc. Such teaching aids are called as **[December-2018]**

(a) General knowledge teaching aids
(b) Skill based teaching aids
(c) Scientific teaching aids
(d) Audio-lingual teaching aids

18. Which teaching aids enhance the skills like reading, listening and pronunciation? **[21st June 2019-Ist Shift]**

(a) Audio-lingual teaching aids.
(b) Scientific teaching aids.
(c) General knowledge teaching aids.
(d) Theoretical based teaching aids.

19. The following teaching aids can be used by a teacher in the classroom as a live interactive device: **[26th June 2019-IInd Shift]**

(1) E-mail (2) Skype
(3) On-line Chat (4) Tele-conferencing
(5) Face-book (6) Blog

Select your answer from the options given below:

(a) (1), (2) and (3) (b) (2), (3) and (4)
(c) (3), (5) and (6) (d) (1), (2) and (4)

20. Among the following which one is an example of instructional software? **[21st June 2019-Ist Shift)]**

(a) Audio podcast (b) Printed material or book
(c) Radio talk (d) Edusat

21. Identify the distinctive feature of traditional method of Indian education from the following list: **[3rd Dec. 2019-Ist Shift]**

(a) 'Direct perception of truth' – both as means and end
(b) Making everything on 'Trust'
(c) Evolving own way of learning
(d) Following Nyaya Philosophy with Deductive - Inductive Process

22. Non-traditional teaching and learning strategies lay emphasis on **[3rd Dec. 2019-Ist Shift]**

(i) Students need-based resource materials and learning standards
(ii) Developing skills, attitude and values
(iii) Promoting In-Box thinking process
(iv) Lecture based model
(v) Acquiring knowledge necessary to respond creatively

Select your answer from the following options :

(a) (i), (ii) and (v) (b) (ii), (iii) and (iv)
(c) (iii), (iv) and (v) (d) (i), (iv) and (v)

HINTS & EXPLANATION

1. (a) Overhead projector slides/transparencies are the visual aids shown by means of an overhead projector. Similarly, cassettes and records are the audio aids which are played by means of a player. So, neither OHP nor tape recorder can be called teaching aids. Working models of machines, natural phenomena, etc., are very useful teaching aids.

2. (a) Listening to the teacher's lecture in the classroom, the listeners remain generally passive. They only listen to the information, neither assessing the lecture nor adding anything from their side.

3. (a) Instructional materials are the aids/tools used in the transaction of educational lessons to assist active learning and evaluation. Some of the common ones are: Transparencies that contain written content to be projected on screen with the help of an overhead projector (OHP); any kind of **printed material** which may refer to that appearing in textbooks or on handouts; **audio cassettes** containing recorded content to be utilised in language lessons; computer software, DVD, CD-ROM, computer courseware, on-line tutorials, and so on.

So, OHP is only the medium of showing instructional material. It itself is not an instructional material.

4. (b) The primary aim of using teaching aids is to 'aid' comprehension and learning.

It may attract students' attention and make teaching fun-filled as associate effects. Options (c) and (d) state the same point.

5. (b) An effective teaching aid is one that motivates and engages students **wholly**, i.e., makes each student focus all their physical and mental faculties on itself.

6. (c) An epidiascope is an optical projector capable of giving images of both opaque and transparent objects. A diorama is a model representing a scene with three-dimensional figures, either in miniature or as a large-scale museum exhibit.

7. (b) Projected aid comprises visuals projected upon a screen by use of a filmstrip projector, slide projector, overhead projector or TV/VCR.

8. (d) Writing fast will hamper the comprehension of children who fail to match the pace. Writing first and then asking students to read will kill time; writing students' stated answers on the board is a futile exercise that will not serve the purpose.

9. (c) The blackboard can be utilised best by a teacher for writing the important and notable points.

10. (c) Diagrams cannot be used for teaching all subjects; hence the word 'diagram' is symbolic of subject-specific teachings aids.

11. (d) Smart Classrooms are technology enabled classrooms that engage the audio-visual senses and enhance teaching- learning by making innovative and meaningful use of learning technology, such as computer systems(desktop/laptop), projector and screen, document camera/visualiser, interactive whiteboard(smart portion with touch panel control systems), specialized software, etc. They also include student response(feedback) system, assistive listening devices, interactive networking, etc., that raise interest and participation.

12. (c) Instructional aids include any material or device used to assist the instructor in teaching-learning process. Used not as a distracting gimmick, they support, supplement, or reinforce learning. They gain and hold the attention of students, helping them remember important information, as the two most important senses—auditory ad visual—are involved. This ensures greater understanding. Teaching aids also solve certain language barrier problems.

13. (b) (A), (B) and (C)

A teaching aid is an object, such as a book, picture, flash card or map; or a device, such as a dvd or a computer, used by a teacher to enhance or enliven classroom instruction. Teaching aids are an integral component in any classroom. The many benefits of teaching aids include helping learners improve reading comprehension skills, illustrating or reinforcing a skill or concept, differentiating instruction and relieving anxiety or boredom by presenting information in a novel and exciting way.

14. (c) Scientific thinking has been the basis of all advancement in the body of human knowledge in every domain.

15. (c) The use of teaching aids is justified on the grounds of optimising learning outcomes of students.

16. (c) (A)-(iv); (B)-(i); (C)-(ii); (D)-(iii)

Small-size class of 2-3 students—Writing on paper

Medium-size class of 10-15 students—Flip-chart or white board

Large size class of20-25stdents— PowerPoint slides

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Extra-large size class of more than 30 students–Oval presentation with display screen

17. (b) Skill-based teaching aids

18. (a) Reading, listening and pronunciation are language skills for which audio-visual aids are needed. Scientific, GK based and theoretical teaching aids are used for teaching other specific subjects.

19. (b) Skype, online chat, and teleconferencing are interactive platforms for free calls and chat where two-way communication is possible and so, can be effectively used as teaching aids for interactive teaching. Facebook, blog and e-mail are one-way only.

20. (c) Instructional Software (IS) programs include pictures, sounds, animations, and other various stimuli used to enhance the development of skills such as reading, writing and problem solving.

Radio talk is instructional software as it gives sound inputs for skill development

Audio podcast: a series of episodes streamed or downloaded by the end user over the Internet

Printed material or book

Edusat : satellite built exclusively for serving the educational sector

21. (a)

22. (a) Traditional teaching-learning strategies were more or less teacher-centric, with learners remaining as passive learners, e.g., lecture method and in-box thinking. Non-traditional strategies hold the learner as the most important stakeholder and focus on students' needs more than anything else, as regards resource materials and learning standards. These promote out-of-the box (creative) thinking and develop skills, attitude and values.

CHAPTER 6

Evaluation Systems

ELEMENTS OF EVALUATION

- Evaluation is a systematic process of collecting, analysing and interpreting evidences of students' progress and achievement both in cognitive and non-cognitive areas of learning for the purpose of taking a variety of decisions.
- Evaluation, thus, involves gathering and processing of information and decision-making.
- Evaluation is a continuous process not a periodic exercise.
- It helps teachers and learners to improve teaching and learning.
- It helps in forming the values of judgement, educational status, or achievement of students.
- Evaluation in one form or the other is inevitable in teaching-learning, as in all fields of activity of education judgements need to be made. Hence, it is desirable that teachers must acquire knowledge and understanding about the various aspects of evaluation and its application in classrooms.
- Teaching for successful learning cannot occur without high quality evaluation.
- Evaluation, needs to be integrated with the process of teaching and learning.
- The greater the integration the better the outcomes of learning. Hence, evaluation has to be so designed that it can be used as a powerful means of influencing the quality of what teachers teach and what students learn.
- Evaluation must provide constant feedback regarding the effectiveness of course — contents, classroom processes and the growth of individual learners besides the appropriateness of the evaluation procedures.
- It must, however, be flexible enough to the extent that it can be experimented with and adapted according to the specific situations and needs of the learner groups.

Goals of Evaluation

- To clarify objectives of education
- To provide guidance
- To provide remedial work
- To diagnose the problems of students
- To identify students needs and levels
- To improve the skills of learning in students
- To identify students aspects of development
- To bring improvements in instructional strategies
- To assess the educational value and utility of the educational programe
- To provide useful feedback
- To influence decision making or policy formulation by provision of empirically driven feedback
- To bring improvement in teaching-learning process
- To assess personality of the students
- To analyze teacher student behavior
- To analyze effectiveness of Audio Visual aids

CHARACTERISTICS OF GOOD EVALUATION

Evaluation should, ideally, be valid, reliable, practicable, fair and useful.

Validity	• A valid evaluation is one which actually tests what is sets out to test i.e., one which actually measures the behaviour described by the objective(s), under scrutiny.
Reliability	• The reliability is a measure of the consistency with which the question, test or examination produces the same result under different but comparable conditions. • A reliable evaluation item gives reproducible scores with similar populations of students.
Practicability	• Evaluation procedures should be realistic, practical and efficient in terms of their cost, time taken and ease of application. • An ideal procedure of evaluation, must be able to be put into practice.
Fairness	• Evaluation must be fair to all students. • This can be possible by accurate reflecting of range of expected behaviours as desired by the course objectives. • To keep fairness in evaluation, it is also desired that students should know exactly how they are to be evaluated.
Usefulness	• Evaluation should also be useful for students. • Feedback from evaluation must be made available to the students and help them to identity their current strengths and weaknesses. • By knowing their strength and weakness, students can think of further improvement.

EVALUATION IN CHOICE BASED CREDIT SYSTEM (CBCS) IN HIGHER EDUCATION

Advantages of CBCS

- Shift in focus from the teacher-centric to student-centric education.
- Student may undertake as many credits as they can cope with (without repeating all courses in a given semester if they fail in one/more courses).
- CBCS allows students to choose inter-disciplinary, intra-disciplinary courses, skill oriented papers (even from other disciplines according to their learning needs, interests and aptitude) and more flexibility for students).
- CBCS makes education broad-based and at par with global standards. One can take credits by combining unique combinations. For example, Physics with Economics, Microbiology with Chemistry or Environment Science etc.
- CBCS offers flexibility for students to study at different times and at different institutions to complete one course (ease mobility of students). Credits earned at one institution can be transferred.

Disadvantages OF CBCS

- Difficult to estimate the exact marks
- Workload of teachers may fluctuate
- Demand good infrastructure for dissemination of education

Formative Evaluation

Formative assessment is carried out during a course of instruction for providing continuous feedback to both the teachers and the learners for taking decisions regarding appropriate modifications in the transactional procedures and learning activities.

Main Features of Formative Evaluation

- It is diagnostic and remedial
- makes the provision for effective feedback
- provides the platform for the active involvement of students in their own learning.
- enables teachers to adjust teaching to take account of the results of assessment
- recognizes the profound influence assessment has on the motivation and self-esteem of students, both of which are cruicial influences on learning
- recognizes the need for students to be able to assess themselves and understand how to improve
- builds on students' prior knowledge and experience in designing what is taught.
- incorporates varied learning styles into deciding how and what to teach.
- encourages students to understand the criteria that will be used to judge their work
- offers an opportunity to students to improve their work
- after feedback, helps students to support their peers, and expect to be supported by them

SUMMATIVE EVALUATION

Summative evaluation is conducted at the end of the academic year after completion of the entire curriculum. The outcomes of the learners to evaluate as well as the course.

- It measures or 'sums-up' how much a student has learned from the course.
- It is usually a graded test, i.e., it is marked according to a scale or set of grades.
- Assessment that is predominantly of summative nature will not by itself be able to yield a valid measure of the growth and development of the child.
- It, at best, certifies the level of achievement only at a given point of time.
- The paper pencil tests are basically a one-time mode of assessment and to exclusively rely on it to decide about the development of a learner is not only unfair but also unscientific.
- Over emphasis on examination marks focusing on only scholastic aspects makes children assume that assessment is different from learning, resulting in the 'learn and forget 'syndrome.
- Besides encouraging unhealthy competition, the overemphasis on Summative Assessment system also produces enormous stress and anxiety among the learners.
- It is this that has led to the emergence of the concept of Continuous and Comprehensive School-Based Evaluation.

COMPUTER BASED TESTING (CBT)

- A Computer-Based Assessment, also known as Computer-Based Testing, e-exam, computerized testing and computer-administered testing, is a method of administering tests in which the responses are electronically recorded, assessed, or both.
- As the name implies, Computer-Based Assessment makes use of a computer or an equivalent electronic device (i.e. handheld computer).
- Computer-Based Assessment enables educators and trainers to author, schedule, deliver, and report on surveys, quizzes, tests and exams.
- Computer-Based Testing may be a standalone system or a part of a virtual learning environment, possibly accessed via the World Wide Web.

Factors Contributing in CBT

Comparability with a paper and pencil test

- It is possible to computerize virtually any traditional test.
- It is far easier to present on the computer screen verbal and numerical items than visual items where there is always the possibility that the screen image will be different from the printed test, even with modern graphics and light sensitive pens.
- Nevertheless, no matter how identical the two tests appear to be it is essential that the reliability, validity and standardization of the computer version be checked.
- Furthermore, it is essential to show that the correlation between the two versions is high.

Presentation of results to subjects

- Immediately the test is finished the computer can present the results to the subject, either on screen or as a printed document. Incidentally it should be pointed out that some of these facilities are possible with paper and-pencil tests which are computer scored. Here the test is administered to subjects in the usual way, but the responses are punched into the computer.

- This allows the printed report for the subjects and comparisons with norm groups to be produced. It also allows a database to be built up for the development of special norms. What of course is not possible is the presentation of items appropriate to the subject, as determined by the subject's responses.
- A number of tests have however been developed specifically for computerized use, and some of these take advantage of the graphic possibilities of the computer.
- As we can see their certain advantages to computer-administered and computer-scored tests – especially the rapid calculation of a subject's results and the immediate presentation of her or his scores in terms of normative groups or other criteria. In addition there are advantages in the ability to present subsets of items.
- There are further advantages including the ability to store all results and develop new or local norms, and the opportunity they allow the tester to examine the statistical quantities of the test, right down to the item level.
- Finally, types of item can be used which are impossible in the traditional test. All this is good and provided that the ethical problems (of presenting results to subjects without their being able to discuss their implications and their own reactions to them) are dealt with, computer-administered tests can be useful.

Advantages and Disadvantages of CBT

Computer-based test also can be supervised or nonsupervised, and can be used for diagnostic, formative or summative assessment. This can take place locally or at a distance, using intranets or the Internet. But there are both advantages and disadvantages with using on-line or computer based assessment.

	ADVANTAGES	DISADVANTAGES
Administrative	• Computerized marking is not prone to human error. • Saves staff time in terms of supervising and marking (including double marking) assessments. • Reduces of printing costs, particularly when tests are updated or changed	• Implementing a CBT can be costly and time-consuming. • Staffs who design and invigilate CBT need training in assessment principles and design, IT skills and examination management. • A high level of collaboration between all those involved in designing and implementing CBT is required. • Some systems cannot implement anonymous marking. • Hardware and software used to deliver CBT needs to be robust in order to avoid failure at crucial times such as examinations.
Pedagogical	• Tutors can incorporate hints into test questions. • Tutors can monitor the progress of students through frequent use of assessment. • Students can monitor their own progress and revise and rehearse at their own pace. • Detailed and specific feedback can be given to students during and immediately after a test. • Tutors can assign different learning activities to students based on their test results. • Can provide tutors with feedback for evaluation of modules/courses/programs.	• Unsupervised CBT sessions present a risk of plagiarism (it can be difficult to authenticate the identity of students). • Students need to have sufficient IT skills and experience of the requirement of CBT. • Staffs have a tendency to just use MCQS which can be tedious and demotivating for students, and it has been argued that MCQS focus on testing superficial levels of students learning.
Other	• Timely feedback; the teacher can provide feedback. • Automatic feedback; some forms of on-line assessment answers (i.e. multiple choices). • Monitoring and tracking of learners' results behavior. • Choice of assessment modes, such as multimedia, interactivity, etc. • Keeping records of results that can be stored centrally and assessed by interested parties, such as students and staff. • Increasing ease with which data can be used as corrected assignment corrected and stored electronically can be analyzed easier and the data can be used in spreadsheets and other statistical packages.	• A high level of organization is required across all parties involved in assessment (academics, support, staff, computer services and administrators). • Assessors and invigilators need training in assessment design, IT skills and examination management. • Technical malfunctions; computer equipment may not always be available or in working order.

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EXERCISE

1. The present annual examination system : **[December-2004]**
(a) promotes rote learning
(b) does not promote good study habits
(c) does not encourage students to be regular in class
(d) All the above

2. The quality of teaching is reflected : **[December-2004]**
(a) By the attendance of students in the class
(b) By the pass percentage of students
(c) By the quality of questions asked by students
(d) By the duration of silence maintained in the class

3. Which of the following is the most important characteristic of Open Book Examination system ? **[December-2005]**
(a) Students become serious.
(b) It improves attendance in the classroom.
(c) It reduces examination anxiety amongst students.
(d) It compels students to think.

4. Which of the following indicates evaluation? **[December-2006]**
(a) Ram got 45 marks out of 200
(b) Mohan got 38 percent marks in English
(c) Shyam got First Division in final examination
(d) Al the above

5. The science of the study of feedback systems in humans, animals and machines is known as: **[June-2006]**
(a) cybernetics (b) reverse communication
(c) selectivity study (d) response analysis

6. A teacher's major contribution towards the maximum self-realization of the student is affected through: **[June-2008]**
(a) Constant fulfillment of the students' needs
(b) Strict control of class-room activities
(c) Sensitivity to students' needs, goals and purposes
(d) Strict reinforcement of academic standards

7. Good evaluation of written material should not be based on: **[June-2009]**
(a) Linguistic expression
(b) Logical presentation
(c) Ability to reproduce whatever is read
(d) Comprehension of subject

8. The academic performance of students can be improved if parents are encouraged to **[December-2010]**
(a) supervise the work of their wards
(b) arrange for extra tuition
(c) remain unconcerned about it
(d) interact with teachers frequently

9. By which of the following methods the true evaluation of the students is possible? **[December-2011]**
(a) Evaluation at the end of the course
(b) Evaluation twice in a year
(c) Continuous evaluation
(d) Formative evaluation

10. Which of the following is not a characteristic of a good achievement test ? **[June-2012]**
(a) Reliability (b) Objectivity
(c) Ambiguity (d) Validity

11. Which one of the following types of evaluation assesses the learning progress to provide continuous feedback to both teachers and students during instruction ? **[September-2013]**
(a) Placement evaluation (b) Formative evaluation
(c) Diagnostic evaluation (d) Summative

12. Identify the category of evaluation that assesses the learning progress to provide continuous feedback to the students during instruction. **[June-2014]**
(a) Placement (b) Diagnostic
(c) Formative (d) Summative

13. Diagnostic evaluation ascertains **[December-2014]**
(a) Students performance at the beginning of instructions.
(b) Learning progress and failures during instructions.
(c) Degree of achievements of instructions at the end.
(d) Causes and remedies of persistent learning problems during instructions.

14. Achievement tests are commonly used for the purpose of : **[June-2015]**
(a) Making selections for a specific job
(b) Selecting candidates for a course
(c) Identifying strengths and weaknesses of learners
(d) Assessing the amount of learning after teaching

15. What are the characteristics of Continuous and Comprehensive Evaluation ? **[December-2015]**
(A) It increases the workload on students by taking multiple tests.
(B) It replaces marks with grades.
(C) It evaluates every aspect of the student.
(D) It helps in reducing examination phobia.
Select the correct answer from the codes given below :
(a) (A) (B) (C) and (D) (b) (B) and (D)
(c) (A), (B) and (C) (d) (B), (C) and (D)

16. Which one of the following statements is correct in the context of multiple-choice type questions ? **[December-2015]**
(a) They are more objective than true-false type questions.
(b) They are less objective than essay type questions.
(c) They are more subjective than short-answer type questions.
(d) They are more subjective than true-false type questions.

17. The main objectives of student evaluation of teachers are: **[December-2015]**
(A) To gather information about student weaknesses.
(B) To make teachers take teaching seriously.
(C) To help teachers adopt innovative methods of teaching.
(D) To identify the areas of further improvement in teacher traits.

Identify the correct answer from the codes given below:

(a) (A) and (B) only (b) (B), (C) and (D) only
(c) (A), (B) and (C) only (d) (A) only

18. The purpose of formative evaluation is to **[August-2016]**
(a) grade students' learning outcomes.
(b) accelerate students' learning performance.
(c) check students' performance graph.
(d) provide feedback to teacher effectiveness.

19. Match the items of the first set with that of the second set in respect of evaluation system. Choose the correct code : **[July-2016]**

Set-I
A. Formative evaluation
B. Summative evaluation
C. Continuous and comprehensive evaluation
D. Norm and criterion referenced test

Set-II
i. Evaluating cognitive and co-cognitive aspects with regularity
ii. Tests and their interpretations based on a group and certain yardsticks
iii. Grading the final learning outcomes comprehensive evaluation
iv. Quizzes and discussions tests

Codes:

	A	B	C	D
(a)	iv	iii	i	ii
(b)	i	ii	iii	iv
(c)	iii	iv	ii	i
(d)	i	iii	iv	ii

20. On the basis of summative tests, a teacher is interpreting his/her students, performance in terms of their wellness life style evident in behaviour. This will be called : **[November-2017]**
(a) Formative testing
(b) Continuous and comprehensive evaluation
(c) Norm - referenced testing
(d) Criterion - referenced testing

21. The principal of a school conducts an interview session of teachers and students with a view to explore the possibility of their enhanced participation in school programmes. This endeavour may be related to which type of research? **[January-2017]**
(a) Evaluation Research (b) Fundamental Research
(c) Action Research (d) Applied Research

22. **Assertion (A) :** Formative evaluation tends to accelerate the pace of learning.
Reason (R) : As against summative evaluation, formative evaluation is highly reliable. **[January-2017]**
Choose the correct answer from the following **code :**
(a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
(c) (A) is true, but (R) is false.
(d) (A) is false, but (R) is true.

23. From the list of evaluation procedures given below identify those which will be called 'formative evaluation'. Indicate your answer by choosing from the **code :** **[July-2018]**
(A) A teacher awards grades to students after having transacted the course work.
(B) During interaction with students in the classroom, the teacher provides corrective feedback.
(C) The teacher gives marks to students on a unit test.
(D) The teacher clarifies the doubts of students in the class itself.
(E) The overall performance of a students is reported to parents at every three months interval.
(F) The learner's motivation is raised by the teacher through a question-answer session.

Code :
(a) (a), (b) and (c) (b) (b), (c) and (d)
(c) (A), (C) and (E) (d) (B), (D) and (F)

24. Think-aloud procedure is: **[21st June 2019-Ist Shift]**
(a) a part of secondary source of data.
(b) a technique used to investigate learner strategies and performance.
(c) a strategy of testing learners' aptitude by providing primary sources.
(d) a necessary method in scientific research.

25. Which is the characteristic of formative evaluation? **[20th June 2019-Ist Shift]**
(a) Evaluation occurs at the terminal point.
(b) Evaluation is used before programme design.
(c) Evaluation relates to indicating learning outcome of teaching.
(d) Evaluation is conducted during teaching.

26. The field of study which uses role playing, simulation and self-evaluation as strategies for adult learners is known as: **[20th June 2019-Ist Shift]**
(a) Pedagogy (b) Andragogy
(c) Anthropology (d) Psychology

27. Which type of evaluation focusses on the identification of deficiencies and difficulties of the learner? **[20th June 2019-IInd Shift]**
(a) Summative evaluation
(b) Follow up evaluation
(c) Diagnostic evaluation
(d) Criterion—referenced evaluation

28. Diagnostic Evaluation ascertains: **[21st June 2019-Ist Shift]**
(a) Students performance at the beginning of instructions.
(b) Causes and remedies of persistent learning problems during instructions.
(c) Degree of achievement of instructional objectives at the end.
(d) Learning progress and failure after instructions.

29. Below are listed some activities performed by a teacher. Which activities are of the nature of formative evaluation? **[21st June 2019-IInd Shift]**

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(1) Giving a mastery test
(2) Conducting quiz action
(3) Evaluating students in grading system
(4) Providing feedback while teaching
(5) Encouraging students to reflect more

Select your answer from the options given below:

(a) (1), (2) and (3) (b) (2), (3) and (4)
(c) (2), (4) and (5) (d) (2), (3) and (5)

30. Which of the following statements is true in the case of a test prepared by you as a teacher?

[25th June 2019-Ist Shift]

(a) If a test is reliable, it is objective
(b) If a test is valid, it is reliable also
(c) If a test is reliable, it is valid
(d) If a test is valid and reliable, it is usable

31. What is the main objective of formative evaluation?

[26th June 2019-IInd Shift]

(a) To promote students to the next class
(b) To enhance students' learning
(c) To enhance co-operation in class
(d) To understand the learning difficulties

32. A teacher intends to find out the learning difficulties of students. Which of the following tests can be used?

[26th June 2019-IInd Shift]

(a) Summative Test
(b) Formative Test
(c) Performance Test
(d) Diagnostic Test

33. The performance of a student is compared with another student in which type of testing?

[26th June 2019 (First Shift)]

(a) Criterion referenced testing
(b) Diagnostic testing
(c) Summative testing
(d) Norm-referenced testing

34. In the following two sets, set I mentions the evaluation system, while set II gives their descriptive features. Match the two sets

[2nd Dec. 2019-Ist Shift]

Set I (Evaluation system)	**Set II (Descriptive features)**
(A) Formative evaluation	(i) Comparing the students performance with that of others
(B) Summative evaluation	(ii) Indicating standards of mastery
(C) Norm-referenced testing	(iii) Diagnosing students' problems
(D) Criterion-referenced testing	(iv) Identifying scope for improvement
	(v) Judging learning standards

Choose the correct answer from the options given below:

(a) A-iv; B-v; C-i;D-ii (b) A-i;B-ii;C-iii; D-iv
(c) A-iii;B-iv; C-ii;D-i (d) A-ii;B-iii; C-v; D-iv

35. Which of the following evaluation systems belongs to the category of being an innovative practice?

[3rd Dec. 2019-Ist Shift]

(a) Semesterized examinations
(b) Performance evaluation
(c) Portfolio based evaluation
(d) Learning outcome based evaluation

36. In which of the following modes of assessment the potential for increasing intrinsic motivation is optimum?

[3rd Dec. 2019-IInd Shift]

(a) Formative assessment based evaluation
(b) Computer testing based assessment
(c) Summative assessment
(d) Norm-referenced based testing assessment

37. Which of the following types of assessment is conducted periodically with an eye on standards?

[4th Dec. 2019-Ist Shift]

(a) Formative assessment (b) Summative assessment
(c) Portfolio assessment (d) Performance assessment

38. Which among the following factors doesn't contribute to assessment bias? **[4th Dec. 2019-IInd Shift]**

(a) When language of the test and the tester is different from the languages of the students
(b) Answers that support middle-class values
(c) If assessment procedures are flexible and diverse to make disadvantaged students comfortable
(d) Objective test for assessing abstract reasoning of the student.

39. A college teacher conducts a quiz session with a view to accelerate the tempo of motivational participation. This will form part of which type of evaluation?

[5th Dec. 2019 (First Shift)]

(a) Summative evaluation (b) Criterion based evaluation
(c) Formative evaluation (d) Diagnostic evaluation

40. Which among the following is NOT an alternative to traditional assessments? [5th Dec. 2019 (First Shift)]

(a) Multiple Choice Questions
(b) Performance Test
(c) Portfolios
(d) Exhibitions

41. Academic performance of students is determined by:
[5th Dec. 2019 (First Shift)]
(A) Intelligence (B) Motivation
(C) Physique (D) Gender
(a) (A) and (B) Only (b) (A) and (D) only
(c) (B) and (C) only (d) (C) and (D) only

42. In a developing country like India which among the following statements is indicative of Challenges in the context of computer based testing?
[5th Dec. 2019-IInd Shift]
(a) Many teachers do not have knowledge of computer
(b) Computer will destroy guru-shishya relationship
(c) Indian government can't afford to buy a large number of computers
(d) In remote locations availability of computer and electricity is not feasible

43. In educational institutions, students usually have group journals/magazines and write in them on regular basis. Which of the following statements are correct about journaling as a method of informal assessment?
[5th Dec. 2019-IInd Shift]
(A) As a tool that provides opportunity to the students to express their thoughts and ideas
(B) As an opportunity to showcase what they have learned
(C) As a way to cope with the stress
(D) As a tool to settle scores with the authority
Choose the correct option:
(a) (A) and (C) only
(b) (B) and (C) only
(c) (A) and (B) only
(b) (C) and (D) only

44. Which of the following is an example of maximum performance test? **[6th Dec. 2019-Ist Shift]**
(a) Interest inventory (b) Projective personality test
(c) Aptitude test (d) Attitude scales

45. Match the following study skills with their respective learning techniques: **[6th Dec. 2019-Ist Shift]**

Study Skills		**Learning Techniques**
(A) Elaborative	i.	Mixing different kinds of interrogation problems together when studying
(B) Practice Testing	ii.	Explaining what a section of text or an example problem means to you
(C) Self-Explanation	iii.	Testing yourself on the material you are trying to learn
(D) Interleaved practice	iv.	Answering why a fact is true

Choose the correct option:
(a) (A)-(iv), (B)-(iii), (C)-(ii), (D)-(i)
(b) (A)-(i), (B)-(ii), (C)-(iv), (D)-(iii)
(c) (A)-(ii), (B)-(iv), (C)-(i),(D)-(iii)
(c) (A)-(iii),(B)-(i), (C)-(ii), (D)-(iv)

46. The main purpose of using ICT for classroom teaching is to **[6th Dec. 2019-IInd Shift]**
(a) Make the classroom instructions interesting
(b) Divert students' attention in the class
(c) Keep students engaged in the class
(d) Optimize learning outcomes of teaching

47. The compositional skills and creativity in presentation of students can be most effectively evaluated by which of the following tests? **[6th Dec. 2019-IInd Shift]**
(a) Objective type tests
(b) Essay type tests
(c) Short answer tests
(d) Projective type tests

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HINTS & EXPLANATION

1. (d) The think tank behind education policies and practices to be followed in the educational institutions felt that the Annual Examination system was promoting rote learning only for the examination instead of inculcating good regular study habits throughout the academic session; and, it was allowing students to skip school and still pass examination. This consideration paved the way for the system of Continuous Comprehensive Evaluation later.

2. (c) Students may attend class for other reasons such as company of friends. They may pass examination by rote learning. Silence in the class may be an outcome of teacher's threat. The questions students ask in the class are a clear indicator of the quality of teaching taking place within. Frivolous questions indicate the rapport existing between the teacher and the students, but also manifest misdirected teaching and failed outcomes. Serious questions pertaining to the topic of discussion show that meaningful teaching is taking place.

3. (d) Open book exams allow you to take notes, texts or materials into an exam. They test your ability to find and apply information and knowledge, so are often used in subjects requiring like law statutes, statistics or acts of parliament. This system compels students to think in an Open book examination allows examinees to consult their class notes, textbooks, and other approved resource material while answering questions. They test their ability of direct reference to written materials to find and apply information and knowledge, and demonstrate their ability to apply theory to a situation. It is ideally suited to teaching programmes that especially aim at developing the skills of critical and creative thinking.

4. (d) All the above

Evaluation involves a systematic collection, analysis and interpretation of information about any aspect of a programme of education or training under a recognised process of determining its effectiveness, efficiency and other outcomes, if any. It is expressed in terms of marks obtained out of a maximum/total attainable score, or corresponding grades; or, percentage score and division/class of performance it places the student in.

5. (a) Cybernetics

Cybernetics is the study of communication and control processes in humans, animals, and some machines, or their characteristic of feedback or automatic control, i.e., the ability to respond or adjust to the environment which helps them proceed in the right direction.

6. (c) Constant fulfilment of the students' needs is likely to make them laidback instead of spurring them on for action, achievement and realization of their potential. Strict control of class-room activities restricts free thinking and fails instructional objectives Strict reinforcement of academic standards is seen to scare and demotivate the average learners. It is only by being sensitive to each student's needs, goals and purposes that the teacher may lead them to self-realization.

7. (d) Good evaluation of written material should be based on the examinee's linguistic expression, logical presentation and ability to reproduce whatever is read. Comprehension of subject is immaterial unless reproduced in intelligible language, in the form of correct logical answers to questions asked.

8. (a) Students have been observed to be taking their studies seriously when they know that their parents are supervising their work and that their performance matters to them.

Extra tuition does not help unless the student is motivated to do well. Frequent parent-teacher meetings may be futile if not in the right direction.

9. (c) As documented by NCERT, 'The RTE Act demands that each child should get an opportunity to learn and progress and be supported during this process. CCE can be a potent tool in respecting the intent of the RTE Act by ensuring learning for all children, as assessment during teaching-learning process would help teachers observe child's learning progress, provide timely feedback support to help the child to overcome the learning difficulties. In that case the state of 'failing' and thus detaining any child at the end of a term can be minimized. Therefore, it is crucial to understand and use both teaching learning and assessment in tandem, one complementing the other to arrive at a realistic picture of students' learning.'

10. (c) Ambiguity

A good achievement test has the following four characteristics:

(i) Reliability—the degree of consistency between two measurements of the same thing.
(ii) Validity—the extent to which the results will serve the purpose for which they are intended.
(iii) Objectivity—means the degree to which different persons performing the test arrive at the same result.
(iv) Usability—having practical value in terms of time, economy, and administration.

11. (b) Formative assessment includes a series of formal and informal evaluation conducted by teachers while the learning process is on, to serve as a continuous

feedback so that teaching and learning activities may be modified for attainment of intended instructional outcomes.

Diagnostic testing aims at detecting learning deficiencies in students and is followed by remedial teaching.

Placement evaluation is used to place students according to prior achievement or personal characteristics, at the most appropriate point in an instructional sequence, in a unique instructional strategy, or with a suitable teacher.

Summative evaluation certifies, grades, or attests the student's successful completion of a complete level of instruction.

12. (c) Formative evaluation refers to a wide variety of methods that teachers use to conduct in- process evaluations of student comprehension, learning needs, and academic progress during a lesson, unit, or course. In other words, formative assessments are for learning, while summative assessments are of learning.

13. (d) Diagnostic assessment is a form of pre-assessment that allows a teacher to determine students' knowledge, skills, strengths and weaknesses, prior to instruction; and diagnose student difficulties so as to steer lesson and curriculum planning accordingly. It benefits both the instructor and the students, as it allows teachers to plan meaningful and efficient focussing on topics not learnt by the students.

Hence, it ascertains causes and remedies of persistent learning problems during instructions.

14. (d) An achievement test is a test of developed skill or knowledge. The most common type of achievement test is a standardized test developed to measure skills and knowledge learned in a given grade level, usually through planned instruction, such as training or classroom instruction.

15. (d) (b), (c) and (d)

Continuous and comprehensive evaluation refers to a student assessment system which covers all facets of education. As per CBSE, it is a developmental process of assessment with a twofold objective— (1) continuity in evaluation to address the 'sudden death' impact of full syllabus exams and reduce the workload on students; and (2) assessment of broad based learning and behavioural outcomes to ensure holistic education. It replaces the marks system with the grading system.

16. (a) Multiple choice type questions are more objective than true-false type questions.

'Objective' as against 'subjective' in terms of a test pertains to factual questions requiring extremely short answers that can be quickly and unambiguously scored by anyone with an answer key, thus minimizing subjective judgements (those based on or influenced by personal feelings, tastes, or opinions).

17. (b) (b), (c) and (d) only

Student evaluation of teachers makes teachers take teaching seriously lest they should be penalised for non-performance; helps teachers adopt innovative methods of teaching, if desired outcomes do not follow; and, identifies the areas of further improvement in teacher traits.

Information on students' weaknesses is gathered from their evaluation by teachers, rather than vice versa.

18. (b) Other forms of evaluation can also grade students' learning outcomes; check their performance graph and provide feedback to teacher effectiveness. However, formative evaluation, by virtue of its scope of improving the teaching process and learning goals through continuous feedback can accelerate students' learning performance.

19. (a) Formative evaluation–Quizzes and discussions

Summative evaluation–Grading the final learning outcomes.

Continuous and comprehensive evaluation–Evaluating cognitive and co-cognitive aspects with regularity

Norm and criterion referenced tests—Tests and their interpretations based on a group and certain yardsticks.

20. (d) A criterion-referenced test is a style of test which uses test scores to generate a statement about the behaviour that can be expected of a person with that score. Most tests and quizzes that are written by school teachers can be considered criterion-referenced tests.

21. (c) Action research can be practical— initiated to find an immediate solution to a practical problem; or, participatory—serve as a reflective process of progressive problem solving by individuals working in teams to improve the way they address issues and solve problems.

Fundamental research aims to improve scientific theories for improved understanding or prediction of natural or other phenomena. Applied research aims to solve a specific, practical problem of an individual or group. Evaluation research is used as a specific research methodology, or, as an assessment process for evaluative purposes.

22. (c) Formative assessment takes place on a day-to-day basis during teaching and learning, allowing teachers and pupils to assess attainment and progress more frequently. It begins with diagnostic assessment, indicating what is already known and what gaps may exist in skills or knowledge. Often formative assessments may not be recorded at all, except perhaps in the lesson plans drawn up to address the next steps indicated.

Summative assessment sums up what a pupil has achieved at the end of a period of time, relative to the learning aims and the relevant national standards. It is an observation or a task usually recorded through a written test. So, it is more reliable than formative evaluation.

23. (d) (b), (d) and (f)

Formative assessment is student-centred. It focuses not on how teachers deliver information but, rather, how students receive, grasp and apply that information. It helps teachers track the learning needs and chart the graph of progress for each student; and use this information to make instructional adjustments. The tests also help students to honestly and accurately use self-assessment to improve their own learning. Unit test marks and report to parents are not part of evaluation procedure.

24. (b) The think-aloud procedure requires students to say out loud what they are thinking about when reading, solving math problems, or simply responding to questions posed by teachers or other students. The procedure brings out the students' learning strategy and work performance.

25. (d) Evaluation for judging the worth of a program while the program activities are in progress is Formative evaluation.

Evaluation done before program design is Program evaluation.

Evaluation done at the end of the program activities with focus on the outcome is Summative evaluation.

26. (b) Pedagogy is the method and practice of teaching, especially as an academic subject or theoretical concept.

Andragogy is the method and practice of teaching adult learners.

Anthropology isthe study of people across the world, their evolutionary history; and how they behave, adapt to different environments, communicate and socialise with one another.

Psychology is the scientific study of the mind and behaviour.

27. (c) Diagnostic evaluation allows a teacher to determine students' individual strengths, weaknesses, knowledge, and skills prior to instruction. It is primarily used to diagnose student difficulties and guide lesson and curriculum planning.

Summative assessment is evaluating student learning, skill acquisition, and academic achievement at the conclusion of a defined instructional period.

Formative assessment is in-process evaluation serving as feedback (for self-reflection) to identify strengths and weaknesses in teaching learning process and target problems/areas that need to be addressed.

Follow-up evaluations is done to test if the program objectives of teacher education programs have been achieved by observing the behaviours of teacher education graduates.

28. (b) Diagnostic evaluation is a form of pre-assessment that allows a teacher to determine students' individual strengths, weaknesses, knowledge, and skills prior to instruction. It is primarily used to diagnose the causes of a student's learning difficulties so that remedies may be planned and implemented during instruction.

29. (c) Formative evaluation is done while the program activities are in progress (forming) as against Summative evaluation which is done after the completion of the program. It serves the purpose of judging the worth of the program.

Conducting quiz action, evaluating students in grading system, and encouraging students to reflect more are done while the lesson/program is in progress rather than after its completion.

30. (b) There are four main characteristics of a good test:

1. Validity
2. Reliability
3. Objectivity
4. Usability

Reliability refers to the consistency of a measure over time (test-retest reliability), across items (internal consistency), and across different researchers (inter-rater reliability).

Validity is the extent to which the test fulfils its purpose, or the scores from a measure represent the variable they are intended to represent.

A test can be reliable without being valid; e.g., a weighing scale will give consistent scores, other conditions being same. However, in case the instrument is malfunctioning, the test will still be reliable if consistent scores are obtained but will not be valid as it may show incorrect weight.

However, if a test is valid, it is definitely reliable; e.g., a class test that is valid or measures what it is intended to measure, will also be reliable as it will give consistent scores, provided other conditions remain unaltered.

By objectivity is meant the degree to which equally competent evaluators obtain the same results. A test is objective when it eliminates the evaluator's bias or prejudice.

By usability is meant the practical value of the test with respect to time, cost-effectiveness and administration.

31. (b) Formative evaluation includes any form of classroom interaction that generates information on student learning, which is then used by teachers and learners to fine-tune their teaching and learning strategies, respectively, during the teaching-learning process.

32. (d) Diagnostic tests measure students' level of understanding of a subject area or a skill set and diagnose the difficulties being encountered by them. Diagnostic tests are typically administered for reading and math skills, with the results used for providing remedial instruction and/or placing students in the appropriate class level.

33. (d) Norm-referenced tests report whether test takers performed better or worse than a hypothetical average

student, which is determined by comparing scores against the performance results of a statistically selected group of test takers, typically of the same age or grade level, who have already taken the exam.

34. (a) Formative assessment refers to the range of formal and informal assessment procedures conducted by teachers during the learning process to measure participants' development at that particular time and diagnose the lapses and requirements; so that teaching and learning processes/activities could be modified to improve student attainment. So, it identifies scope for improvement.

Summative assessment is carried out after the completion of a course/programme to assess its achievement /outcome/success. So, it judges leaning standards.

Norm-referenced testing measures the position of a student in a class/group- with respect to the trait being measured. So, it compares a student's performance with others.

Criterion referenced testing evaluates and grades students' learning against a set of pre-specified criteria, without reference to the achievement of others. So, it indicates the standards of mastery.

35. (d) OBE or outcome-based evaluation starts with clear definition of learning outcomes to be achieved followed by designing of curriculum and instruction on the same lines and assessment based on that to make sure the planned outcomes have been achieved or desired learning ultimately has happened. This is an innovative practice. The others mentioned are the traditional ones.

36. (a) Learners are intrinsically motivated unless any de-motivating factor comes into play. Intrinsic motivation in the learners can be promoted when they attain short term learning outcomes and feel enthused to go for more. This purpose is best served by formative evaluation which involves in-process assessment of learners and helps them to trace their weaknesses and work on those to better their performance. Summative assessment is final , end-of- class assessment which leaves no scope for improvement; computer-test method gives no chance to correct a mistake, norm-referenced test gives a percentile and compare students' progress to others in their peer group, which lowers motivation.

37. (b) Summative assessment is conducted periodically, usually at the end of an instructional unit, to evaluate student learning in comparison with some standard or benchmark.

38. (c) If the assessment procedure is rigid about the language, mode, means and method of the assessment and promotes certain culture specific values; it is biased against those who may be comfortable with different ones. So, if assessment procedures are flexible and diverse to make disadvantaged students comfortable, it doesn't contribute to assessment bias.

39. (c) This will form part of Formative evaluation, which is a method for judging the worth of a program while the program activities are in progress. They can be conducted during any phase of the process, and consist of a range of formal and informal assessment procedures conducted by teachers during the learning process in order to modify teaching and learning activities to improve student attainment.

40. (a) The most widely used traditional assessment tools are multiple-choice tests, true/false tests, short answers, and essays. Alternative assessment strategies include open-ended questions, performance test, exhibits, demonstrations, hands-on execution of experiments, computer simulations, and portfolios.

41. (a) Intelligence and motivation determine academic performance of students. Gender or physique does not affect it.

42. (d) India being a developing country, has not yet achieved complete electrification and computer networking in its remote areas. Computer-based testing requires electricity and internet connectivity to run.

43. (a) A journal/diary is a personal record of news and events made on a regular basis. In educational institutions, student journals are a specific assessment tool teachers can use to examine student learning in the affective and cognitive domains. Journaling provides a non-threatening platform for students to communicate/ express their thoughts and ideas; and confess their struggles and fears without judgment or punishment. It relieves stress when one gets all of those cluttered or disturbing thoughts and feelings out of one's mind and down on paper.

44. (c) Aptitude test is a maximum performance test.

Tests are of two major categories:

I. **Maximum Performance Tests** which are designed to test the limits of the persons' knowledge and abilities. These are of various kinds.

(a) Achievment & Aptitude Tests

- Achievement Tests assess knowledge from previous instruction.
- Aptitude Tests measure cognitive ability and skills.

(b) Speed & Power Tests

- Speed Tests measure the rate of performing a task
- Power tests measure the difficulty in answering correctly

(c) Objective & Subjective Tests

- Objective tests like multiple choice test require exact answers and no subjective judgment.
- Subjective tests require subjective judgment and descriptive expression.

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II. Typical Response Tests measure things like personality, behaviour, attitudes or interests. These are of two main kinds.

Objective & Projective Personality Tests

- Objective Personality test measures Personality or interest inventory. TRUE/ FALSE
- Projective Personality test-ambiguous material Roy-Shock Ink blot test

45. (a) The study skills and their corresponding learning techniques are paired as under:

Elaborative interrogation-- Answering why a fact is true

Practice testing--Testing yourself on the material you are trying to learn

Self-explanation-- Explaining what a section of text or an example problem means to you

Interleaved practice--Mixing different kinds of problems together when studying

46. (d) The ultimate purpose of the teaching-learning process is to fulfil the planned objectives and realise the learning outcomes to the optimal level. Various methods and aids are used to optimize the learning outcomes. ICT is one of the most effective methods/ aids used for the purpose. Its audio-visual inputs involve/engage multiple senses of the learner and enhance learning. Making the classroom instruction interesting and keeping the learners engaged are the subsidiary functions of ICT. It does not divert attention from learning because it is used in the classroom for showing subject-related capsules only.

47. (b) Objective and short answer type tests and see k only factual answer to be stated in limited number of words.

Projective tests are a type of personality test in which the individual must respond to ambiguous scenes, words or images or in some cases even draw. Unlike objective tests, the answers to projective tests can be very varied and there are no correct or incorrect answers.

Essay type tests require the skill to create descriptive answers by composing good, meaningful and grammatically correct sentences in a logical and impressive style.

CHAPTER 7

Research

MEANING OF RESEARCH

Research is the careful, detailed and systematic process of studying materials and sources by means of an organised investigation, experimenting and fact finding with the aim of solving problems, establishing facts and reaching new conclusions. It is a study into a specific problem, concern, or issue using the scientific method.

PURPOSE OF RESEARCH

A research is undertaken for any of the following purposes:

1. To gain new insight into a phenomenon; for which a new research problem or hypothesis is formulated.
2. To investigate the characteristics of an individual or group event/ situation; for which the design is descriptive and an initial hypothesis is optional.
3. To determine the frequency of some occurrence or something associated with an occurrence; for which initial hypothesis is optional.
4. To experimentally and scientifically test the causal relationship between testable variables in a controlled environment.

OBJECTIVES OF RESEARCH

Objectives may be general and/or specific.

The **General Objectives** are the broad goals of any research study, as summarised below:

1. To review an existing body of knowledge/phenomenon
2. To explore and analyse a problem/question/issue/cause
3. To gain new insight into an existing body of knowledge/ phenomenon
4. To investigate and understand a new phenomenon
5. To suggest solution/answer to the research problem/question
6. To produce/construct/generate new knowledge

The **Specific Objectives** of a particular research study are short term and narrow in focus. They are constructed in accordance with Bloom's Taxonomy of human cognition, using verbs pertaining to the various **domains**, as suggested below:

Knowledge: identify, record, relate, define, describe, indicate, outline, state

Application: apply, compute, calculate, demonstrate, measure, illustrate, demonstrate, discover, examine, interpolate, classify, solve, divide, modify, manipulate, produce, show, translate, use

Analysis: develop, infer, differentiate, appraise, analyze, identify, deduce, measure, analyze, separate, break down, detect, illustrate, outline, test

Comprehension: extrapolate, assess, generalize, compare, classify, predict, understand, associate, convert, discuss, explain, extend, predict, summarize

Evaluation: determine, measure, project, evaluate, compare, assess, conclude, contrast, criticize, grade, interpret, judge justify, rank, support

Synthesis: integrate, compile, construct, reconstruct, create, design, organize, combine, compose, develop, formulate, categorize, devise, generate

ESSENTIAL CHARACTERISTICS OF RESEARCH

A genuine and valued research study invariably has the following essential characteristics:

1. **Thoroughly planned in advance**
2. **Systematic in approach**
3. **Collects empirical data in real time from actual observations in natural settings**
4. **Objective** (observation, tests, evaluation are free from researcher's bias)
5. **Accurate in procedures, instruments, tests, measurements, etc.**
6. **In-depth data analysis eliminating errors/anomalies**
7. **Logical** (uses deductive and inductive reasoning)
8. **Reliable** (is consistent in results)
9. **Valid** (results truly represent what the research study intended to measure)
   i. *Face/logical validity*—superficial and subjective view of participants about how well tests/tools (questionnaire, interview, etc.) measure what they intend to.
   ii. *Internal validity*— how well pronounced is the causal relationship between the variables, particularly in experimental research.
   iii. *External validity*—extent to which the outcome of a study may apply to other settings.
   iv. *Content validity*— extent to which the tests/ measurements cover all aspects of the construct
   v. *Construct validity*—how well the tests/measurements/ scores actually test the hypothesis or theory they are measuring. Convergent construct validity: constructs which are meant to be related are related. Discriminant construct validity: constructs not expected to be related are unrelated. Good construct validity is ensured by a strong convergent construct validity and no discriminant construct validity.
   vi. *Criterion/concrete validity*—extent to which a measure is related to an outcome.
10. **Verifiable/ Justifiable** (other researchers may test the validity of the outcome)
11. **Controllable** (can control and minimize the influence of unrequired factors while testing causality between two variables)

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12. **Relevant** (adds new knowledge or fills gaps in the existing body of knowledge)
13. **Generalisable** (sample results apply to the entire population from where sample is collected)
14. **Ethical** (researchers invariably follow moral principles in the process of conducting their research)
15. **Cyclic/** (starts with a research question and generates new questions for further research)

TYPES OF RESEARCH PARADIGM

A research paradigm is a specific model of conducting a research that has been validated and practised by researchers for many years. Every research uses one research paradigm to develop the research methodology for a valid and appropriate study.

1. Positivism

According to the positivist paradigm of exploring social reality, true knowledge is based on experience of senses and can be obtained by observation and experiment. It emphasizes quantitative analysis over qualitative analysis. Determinism, empiricism, parsimony and generality are the defining characteristics of Positivistic research.

2. Constructivism/Interpretivism

It developed as a critique of positivism in social sciences. It opposes the positivist idea that knowledge can only be generated through a scientific method; and argues that it is rather constructed by the researcher. It holds that knowledge and therefore all meaningful reality as such, is constructed when information comes into contact with existing knowledge based on human experiences. Thus, it emphasizes qualitative analysis over quantitative analysis.

3. Post-Positivism

It is an effective paradigm for social and educational research. It is a balanced combination of positivism and interpretivism approaches and focuses on researching issues in the context of experiences of the majority, declaring the opinion of the majority as their result.

4. Pragmatism

It adopts the modified philosophical assumptions between the two extreme mutually exclusive paradigms of Positivism and Interpretivism. Pragmatists take directed action as the starting point for theory, and understand experience as a transaction between the organism and the environment that constitutes both the subject and the object of knowledge.

5. Transformative Paradigm

Transformative research paradigm focuses on the marginalized communities, analyses the power differentials that have effected the marginalization, and applies the research findings to actions directed at ending inconsistencies.

6. Critical Theory

It is a school of philosophy which challenges the dominant ways of exploring and explaining organizational phenomenon and offers alternative possibilities that include the marginalised into the mainstream. Its epistemology is dialectical reason. Its ontology includes critiques of the political economy, of domination and exploitation and of ideology. Its praxeology consists of critical ethics, struggles and political practice. It is more or less similar to the transformative paradigm.

Table of Comparison: Research Paradigms

Paradigm	Ontology	Epistemology	Approach & Methodology (or Praxeology)	Axiology
Positivism	The reality is objective and perceived	Acquisition of knowledge is not related to values and moral content	Deductive Approach; Quantitative methods (experiment, quasi-experiment)	Research is value- free; researcher is objective and independent of the data.
Constructivism	Reality is subjective, socially and experimentally relative, and local and specific in nature	The knowledge consists of mental structures that are surrounded by the relative agreements	Predominantly Qualitative: Case study, interview	Research is value laden; researcher is biased by world views, cultural experiences and upbringings.
Interpretivism	Researcher and reality are inseparable	Knowledge is based on the abstract descriptions of meanings, formed of human experiences	Inductive approach; Predominantly Qualitative methods (Case study, interview, phenomenology, ethnography, ethnomethodology	Research is value bound; researcher is subjective being part of the subject under research.
Pragmatism	The reality is ambiguous, but based on the language, history, and culture respect	Knowledge is derived from experience. The researcher restores subjectively assigned and "objective" meaning of other actions	Qualitative and/or Quantitative: Interview, case study, survey, experiment	Values are instrumental in interpreting results; the researcher adopts both objective and subjective points of view— generally tested ethical values being acceptable to all.

Transformative	Multiple realities are shaped by social, political, cultural, economic, ethnic, gender, disability and other values.	Knowledge is contextual to social and historical situation and communicative interactions; power and privilege are important factors; trust is critical in relationship.	Usually Quantitative and mixed methods; but using Qualitative methods for exploring dialectic relationship between the individual and the society is crucial to address cultural complexities and power issues.	Ethics involved is respect for cultural norms of interaction; beneficence involved is promotion of human rights and increase in social justice.

CLASSIFICATION OF RESEARCH (TYPES OF RESEARCH)

Table of Comparison: Qualitative Vs Quantitative Research

	QUALITATIVE	QUANTITATIVE
Basic framework	Objective is to explore phenomena	Objective is to confirm hypotheses about phenomena
	Style of eliciting and categorizing responses are flexible and iterative	Style of eliciting and categorizing responses to questions are rigid
	Methods used (in-depth interviews, focus groups, participant observation) are semi-structured	Methods used (questionnaires, surveys, structured observation) are highly structured
Analytical objectives	To describe variation	To quantify variation
	To describe and explain relationships	To predict causal relationships
	To describe individual experiences	To describe characteristics of a population
	To describe group norms	
Question format	Open-ended	Closed-ended
Nature of Data	Textual (obtained from audiotapes, videotapes, and field notes)	Numerical (obtained by assigning numerical values to responses)
Nature of study design	Some aspects (e.g., language, number of interview questions) are flexible	Stable throughout
	Researchers' questions are determined/influenced by participant responses	Researchers' questions are not determined/ influenced by participant responses
	Data collection methods and research questions are adjusted according to what is learned	Data collection methods and research questions are subject to statistical assumptions/conditions

Table of Comparison: Basic Vs Applied Research

	BASIC RESEARCH	APPLIED RESEARCH
Aim	To expand existing scientific knowledge; make generalisations; formulate new theory	To solve specific practical problems; answer specific question; make conclusions; develop technology or technique
Nature	Theoretical	Practical
Scope	Universal	Limited
Examples	Study of human behaviour to make certain generalisations;	copy research, market research, evaluation research, study of social/ economic/political trends to draw conclusions

Table of Comparison: Deductive Vs. Inductive Approach

	Deductive approach	Inductive approach
Research strategy	Quantitative	Qualitative
Process Direction	Top to bottom General to the particular	Bottom to top Particular to the general
Focus	on validating theory; and testing hypotheses	on understanding dynamics; and gauging strengths
	on 'Mean' behaviour	on individual behaviour
	on constructing most likely future	on constructing alterative futures

Type of reasoning	objective	subjective
	To obtain causation	To obtain meaning
Type of question	Pre-specified; outcome oriented	Open-ended; process oriented
Type of analysis	Numerical estimation; Statistical inference; (also, Qualitative comparative analysis)	Narrative description; Constant comparison; (also, Exploratory data analysis)
Advantages	Allows quantitative measurement and explaining of causal relationships between concepts and variables	Allows working with a whole lot of probabilities
	Possibility to generalize research findings to a certain extent	Possibility of fuelling further research
Disadvantages	Limited scope of creativity	Limited scope
	Not flexible	Inaccurate inferences
Preferred when	Literature is abundant	Literature is scarce
	Time is limited	There's no shortage of time

1. EXPLORATORY RESEARCH

It is conducted with the aim of exploring certain questions. So, the data analysis may not resolve the perceived problem or provide conclusive answers. It basically aims at exploring new problem areas which haven't been tried before. This exploratory process, however, serves to lay the foundation for more conclusive data collection and research.

2. EXPLANATORY RESEARCH

It is undertaken to understand and explain the impact caused by changes introduced in the existing standard procedures; so, it is also called causal research. The most popular method of casual research is by conducting experiments.

3. DESCRIPTIVE RESEARCH

It describes a situation, subject, behaviour, or phenomenon. It focuses on expanding knowledge on current issues through a process of data collection. Descriptive studies are used to describe the behaviour of a sample population. In a descriptive study, only one variable is required to conduct the study.

4. EXPERIMENTAL/CAUSAL RESEARCH

It strictly adheres to a scientific research design. It investigates a hypothesis through experiments in a controlled environment where a variable can be manipulated by the researcher against variables that can be measured, calculated and compared. Participants in an experimental research are assigned their subject-groups randomly which means a participant has an equal probability of being placed in the experimental or control group. Random assignment helps ensure that there are no systematic differences between the groups before the experiment so that when some condition is applied to the experimental and control groups, there isn't some predilection/preference/tendency in one group to respond differently from the other.

5. EX-POST FACTO RESEARCH

It examines how an independent variable or a quality that is present in participants prior to the study affects some dependent variable. An ex post facto design is considered quasi-experimental because the subjects are not randomly assigned to participants (unlike experimental studies). The participants are grouped on the basis of a particular characteristic or trait (variable) that is of interest to the researcher.

6. OBSERVATIONAL RESEARCH

It refers to a wide variety of non-experimental studies in which a variable or set of variables showing specific behaviour is systematically observed and the data, collected. It is non-experimental as no variable is manipulated or controlled; and hence, causal conclusions cannot be made using this approach.

7. DEVELOPMENTAL RESEARCH

The purpose of developmental research is to assess changes over an extended period of time. For example, developmental research would be an ideal choice to assess the differences in academic and social development in low-income versus high-income neighbourhoods. It is most common when working with children as subjects for obvious reasons and can be undertaken using several methods: longitudinal, cross sectional, and cross sequential. It uses methods such as longitudinal, cross sectional, and cross sequential studies.

8. ANALYTICAL RESEARCH

It involves an in-depth study to explain a complex phenomenon. It is primarily concerned with analyzing the facts or information already available to specify, interpret and establish cause and effect relationships and test the hypothesis. It employs the researcher's critical thinking skills to analyse the data (facts and information relative to the research being conducted); and to make a critical evaluation of the new knowledge/product or attempt to establish why a phenomenon exists in the way it does or how it came to be that way. Using analytical research, students, doctors and psychologists find out critical details to add new ideas to the material being produced.

9. HISTORICAL RESEARCH

It involves studying, understanding and interpreting past events with the purpose of gaining insights into or drawing conclusions from particular events, figures or social issues in history (past times); and establishing links between the old and the new.

Interpretations are mainly done from documents, chronicles, journals and diaries. Primary sources, though preferred by historical researchers for being more accurate, are scarce. So, much of historical research bears the shortcoming of excessive reliance on secondary sources.

Diaries, memoirs, posts and testimonies often carry a bias or an enhanced picture of the writer. Because of this likelihood, historical data is unacceptable at face value, and has to be examined for its authenticity and truthfulness.

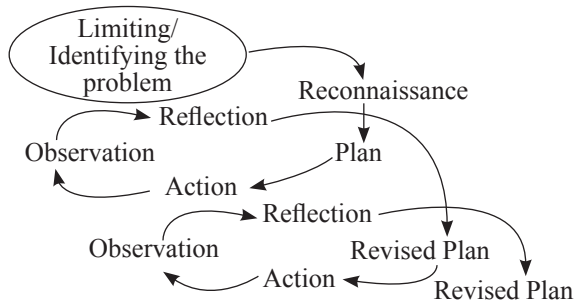
10. SOCIAL RESEARCH

It involves structural observation/study of social behaviour by collecting information about people and societies. Different socio-economic groups think and act differently. Different aspects of human behaviour need to be studied to understand their thoughts and dynamics of the social world. Social research may be employed to gauge new market trends, to introduce specific products/services/features catering to specific needs of the people, to upgrade old technology, etc.

11. ACTION RESEARCH

It comprises either a research process aimed at implementing required action to solve an immediate problem; or, a reflective spiral of research, action, evaluation, and revision/repetition of the steps for progressive problem solving.

The steps can be shown in a spiral as follows:



12. CLINICAL RESEARCH

Clinical research involves clinical trials and other research protocols performed on real people (volunteers participating in studies) to test the efficacy and/or safeness of a new drug, prevention strategy, or screening test. Clinical research is undertaken with the approval of doctors, administrators, ethicists and people representatives. Participants are informed about the risks involved and asked to sign the consent form before they are accepted into a clinical trial.

13. PHENOMENOLOGY

Phenomenology focuses on experiences, events and occurrences with disregard or minimum regard for the external and physical reality. Phenomenology, also known as non-positivism, is a variation of interpretivism along with other variations such as hermeneutics, symbolic interactionism and others.

14. ETHNOGRAPHY

Ethnography is the scientific description of a particular human society, its peoples and cultures, with their customs, practices and diversities through participatory, analytical and comparative field studies.

15. GROUNDED THEORY

Grounded theory begins with no pre-existing theory, hypothesis, or expectation of findings. It only describes the topic of study and facilitates a theory to emerge directly from the data, which implies the theory is grounded in the data. The researcher selects individual cases on theory and purpose, (not randomly), collects and analyses data simultaneously, develops adequate theoretical conceptualisations of findings and allows findings and conceptualisations to grow together and cross-fertilise.

EXERCISE

1. Which of the following is NOT the characteristic of a research ? **[December-2004]**
   (a) Research is systematic
   (b) Research is not a process
   (c) Research is problem oriented
   (d) Research is not passive

2. Which of the following statement is correct ? **[December-2004]**
   (a) Discoveries are researches
   (b) Researches lead to discovery
   (c) Invention and Research are related
   (d) None of the above

3. Which of the following statement is correct ? **[December-2004]**
   (a) In research, objectives can be worded in question form
   (b) In research, objectives can be worded in statement form
   (c) Objectives are to be stated in Chapter I of the Thesis
   (d) All the above

4. One of the following is not a quality of researcher: **[December-2005]**
   (a) Unison with that of which he is in search
   (b) He must be of alert mind
   (c) Keenness in enquiry
   (d) His assertion to outstrip the evidence

5. Which of the following statement is correct ? **[December-2005]**
(a) objectives should be pin-pointed
(b) objectives can be written in statement or question form
(c) another word for problem is variable
(d) all the above

6. The important pre-requisites of a researcher in sciences, social sciences and humanities are : **[December-2005]**
(a) laboratory skills, records, supervisor, topic
(b) Supervisor, topic, critical analysis, patience
(c) archives, supervisor, topic, flexibility in thinking
(d) topic, supervisor, good temperament, pre-conceived notions

7. Research can be conducted by a person who: **[December-2006]**
(a) has studied research methodology
(b) holds a postgraduate degree
(c) possesses thinking and reasoning ability
(d) is a hard worker

8. Which of the following statements is correct? **[December-2006]**
(a) Objectives of research are stated in first chapter of the thesis
(b) Researcher must possess analytical ability
(c) Variability is the source of problem
(d) All the above

9. Which of the following options are the main tasks of research in modern society? **[June-2006]**
I. to keep pace with the advancement in knowledge.
II. to discover new things.
III. to write a critique on the earlier writings.
IV. to systematically examine and critically analyse the investigations/sources with objectivity.
(a) IV, II and I (b) I, II and III
(c) I and III (d) II, III and IV

10. What do you consider as the main aim of inter disciplinary research? **[June-2006]**
(a) To bring out holistic approach to research.
(b) To reduce the emphasis of single subject in research domain.
(c) To over simplify the problem of research.
(d) To create a new trend in research methodology.

11. The depth of any research can be judged by: **[June-2006]**
(a) title of the research.
(b) objectives of the research.
(c) total expenditure on the research.
(d) duration of the research.

12. Research can be classified as: **[December-2006]**
(a) Basic, Applied and Action Research
(b) Quantitative and Qualitative Research
(c) Philosophical, Historical, Survey and Experimental Research
(d) All the above

13. The main characteristic of scientific research is: **[December-2007]**
(a) empirical (b) theoretical
(c) experimental (d) all of these

14. Authenticity of a research finding is its: **[December-2007]**
(a) Originality (b) Validity
(c) Objectivity (d) All of these

15. Fundamental research reflects the ability to: **[June-2007]**
(a) Synthesize new ideals
(b) Expound new principles
(c) Evaluate the existing material concerning research
(d) Study the existing literature regarding various topics

16. The study in which the investigators attempt to trace an effect is known as: **[June-2007]**
(a) Survey Research (b) 'Ex-post Facto' Research
(c) Historical Research (d) Summative Research

17. The research that applies the laws at the time of field study to draw more and more clear ideas about the problem is: **[December-2008]**
(a) Applied research (b) Action research
(c) Experimental research (d) None of these

18. The research is always - **[December-2008]**
(a) verifying the old knowledge
(b) exploring new knowledge
(c) filling the gap between knowledge
(d) all of these

19. Action research is **[December-2009]**
(a) An applied research
(b) A research carried out to solve immediate problems
(c) A longitudinal research
(d) Simulative research

20. Manipulation is always a part of **[December-2009]**
(a) Historical research (b) Fundamental research
(c) Descriptive research (d) Experimental research

21. How can the objectivity of the research be enhanced? **[June-2009]**
(a) Through its impartiality (b) Through its reliability
(c) Through its validity (d) All of these

22. Action-research is: **[June-2009]**
(a) An applied research
(b) A research carried out to solve immediate problems
(c) A longitudinal research
(d) All the above

23. The basis on which assumptions are formulated: **[June-2009]**
(a) Cultural background of the country
(b) Universities
(c) Specific characteristics of the castes
(d) All of these

24. The research which is exploring new facts through the study of the past is called **[December-2009]**
(a) Philosophical research (b) Historical research
(c) Mythological research (d) Content analysis

25. Which of the following is classified in the category of the developmental research? **[June-2009]**
(a) Philosophical research (b) Action research
(c) Descriptive research (d) All the above

26. Research is **[June-2010]**
(a) Searching again and again
(b) Finding solution to any problem
(c) Working in a scientific way to search for truth of any problem
(d) None of the above

27. Action research means **[June-2010]**
(a) A longitudinal research
(b) An applied research
(c) A research initiated to solve an immediate problem
(d) A research with socioeconomic objective

28. If a researcher conducts a research on finding out which administrative style contributes more to institutional effectiveness? This will be an example of **[June-2010]**
(a) Basic Research (b) Action Research
(c) Applied Research (d) None of the above

29. Which of the following phrases is not relevant to describe the meaning of research as a process ? **[December-2010]**
(a) Systematic Activity (b) Objective Observation
(c) Trial and Error (d) Problem Solving

30. Controlled group condition is applied in **[December-2011]**
(a) Survey Research (b) Historical Research
(c) Experimental Research (d) Descriptive Research

31. Research is conducted to **[June-2011]**
I. Generate new knowledge
II. Not to develop a theory
III. Obtain research degree
IV. Reinterpret existing knowledge
Which of the above are correct ?
(a) I, III & II (b) III, II & IV
(c) II, I & III (d) I, III & IV

32. The essential qualities of a researcher are **[June-2011]**
(a) spirit of free enquiry
(b) reliance on observation and evidence
(c) systematization or theorizing of knowledge
(d) all the above

33. The research that aims at immediate application is **[June-2012]**
(a) Action Research (b) Empirical Research
(c) Conceptual Research (d) Fundamental Research

34. Ex Post Facto research means **[June-2012]**
(a) The research is carried out after the incident
(b) The research is carried out prior to the incident
(c) The research is carried out along with the happening of an incident.
(d) The research is carried out keeping in mind the possibilities of an incident.

35. The post-industrial society is designated as **[December-2013]**
(a) Information society (b) Technology society
(c) Mediated society (d) Non-agricultural society

36. The principles of fundamental research are used in **[December-2013]**
(a) action research (b) applied research
(c) philosophical research (d) historical research

37. Which is the main objective of research? **[December-2013]**
(a) To review the literature
(b) To summarize what is already known
(c) To get an academic degree
(d) To discover new facts or to make fresh interpretation of known facts

38. The research approach of Max Weber to understand how people create meanings in natural settings is identified as **[June-2014]**
(a) positive paradigm (b) critical paradigm
(c) natural paradigm (d) interpretative paradigm

39. Who among the following, propounded the concept of paradigm? **[June-2014]**
(a) Peter Haggett (b) Von Thunen
(c) Thomas Kuhn (d) John K. Wright

40. When planning to do a social research, it is better to **[December-2014]**
(a) Approach the topic with an open mind
(b) Do a pilot study before getting stuck into it
(c) Be familiar with literature on the topic
(d) Forget about theory because this is a very practical

41. What is a Research Design ? **[December-2014]**
(a) A way of conducting research that is not grounded in theory.
(b) The choice between using qualitative or quantitative methods.
(c) The style in which you present your research findings e.g. a graph.
(d) A framework for every stage of the collection and analysis of data.

42. Jean Piaget gave a theory of cognitive development of humans on the basis of his : **[June-2015]**
(a) Fundamental Research (b) Applied Research
(c) Action Research (d) Evaluation Research

43. Which of the following statements regarding the meaning of research are correct? **[June-2015]**
(A) Research refers to a series of systematic activity or activities undertaken to find out the solution of a problem.
(B) It is a systematic, logical and an unbiased process wherein verification of hypothesis, data analysis, interpretation and formation of principles can be done.
(C) It is an intellectual enquiry or quest towards truth.
(D) It leads to enhancement of knowledge.
Select the correct answer from the codes given below :
(a) (A), (B) and (C) (b) (B), (C) and (D)
(c) (A), (C) and (D) (d) (A), (B), (C) and (D)

44. The conclusions/findings of which type of research cannot be generalized to other situations? **[June-2015]**
(a) Historical Research
(b) Descriptive Research
(c) Experimental Research
(d) Causal Comparative Research

45. In doing action research what is the usual sequence of steps? **[January-2017]**
(a) Reflect, observe, plan, act
(b) Plan, act, observe, reflect
(c) Plan, reflect, observe, act
(d) Act, observe, plan, reflect

46. Which of the following research types focuses on ameliorating the prevailing situations ? **[November-2017]**
(a) Fundamental Research (b) Applied Research
(c) Action Research (d) Experimental Research

47. Which of the sets of activities best indicate the cyclic nature of action research strategy ? **[July-2018]**
(a) Reflect, Observe, Plan, Act
(b) Observe, Act, Reflect, Plan
(c) Act, Plan, Observe, Reflect
(d) Plan, Act, Observe, Reflect

48. There are two sets given below. Set - I specifies the types of research, while Set - II indicates their characteristics. Match the two and give your answer by selecting the appropriate code. **[July-2018]**

Set - I (Research types) Fundamental
(a) research (b) Applied research
(c) Action research (d) Evaluative research

Set - II (Characteristics)
(i) Finding out the extent of perceived impact of an intervention
(ii) Developing an effective explanation through theory building
(iii) Improving an existing situation through use of interventions
(iv) Exploring the possibility of a theory for use in various situations
(v) Enriching technological resources

Code:

	(A)	(B)	(C)	(D)
(a)	(ii)	(iv)	(iii)	(i)
(b)	(v)	(iv)	(iii)	(ii)
(c)	(i)	(ii)	(iii)	(iv)
(d)	(ii)	(iii)	(iv)	(v)

49. The originality of a research topic will depend upon factors of **[December-2018]**
(A) Uniqueness of the topic
(B) Utilitarian dimensions
(C) Support system
(D) Non-requirement of supervision
(E) Feasibility of the study

Code:
(a) (A), (B), (C) and (E) (b) (B), (C), (D) and (E)
(c) (A), (B), (D) and (E) (d) (A), (B), (C) and (D)

50. Which of the following action sets best represent an action research cycle? **[20th June 2019-Ist Shift]**
(a) Reflect, act, plan and observe
(b) Plan, act, observe and reflect
(c) Observe, plan, reflect and act
(d) Act, plan, observe and reflect

51. Participation in which type of research has the great potential for ensuring the improvement of the professional as well as work situation? **[21st June 2019-IInd Shift]**
(a) Fundamental research (b) Applied research
(c) Evaluative research (d) Action research

52. In which of the following research studies interpretation and meaning get more attention than formulation of generalisations? **[24th June 2019-Ist Shift]**
(i) Historical studies
(ii) Survey studies
(iii) Philosophical studies
(iv) Ethnographic studies
(v) Hypothetico-deductive studies
(vi) Ex-post facto studies
Choose your answer from the options given below:
(a) (i), (ii) and (iii) (b) (iv), (v) and (vi)
(c) (ii), (iv) and (v) (d) (i), (iii) and (iv)

53. Research that focuses on social inequality between men and women is called **[25th June 2019-Ist Shift]**
(a) Comparative research (b) Longitudinal research
(c) Action research (d) Feminist research

54. Which of the following research types has a potential for enhancing teaching competencies? **[25th June 2019-IInd Shift]**
(a) Fundamental research
(b) Applied research
(c) Impact assessment research
(d) Action research

55. Which of the following research is cyclic in nature'? **[2nd Dec. 2019-IInd Shift]**
(a) Fundamental research (b) Applied research
(c) Action research (d) Evaluative research

56. In the post positivistic approach to research which of the following types of researches got emphasized? **[3rd Dec. 2019-Ist Shift]**
(A) Experimental research (B) Phenomenological research
(C) Ethnographic research (D) Ex Post Facto research
(E) Action research
Given the correct answer from the options given below:
(a) (A), (B) and (C) (b) (B), (C) and (D)
(c) (B), (C) and (E) (d) (C), (D) and (E)

57. Which among the following is not the outcome of grounded theory research? **[4th Dec. 2019-IInd Shift**
(a) Concepts (b) Narrative
(c) Categories (d) Hypotheses

58. In research, reliability is that quality of a measurement procedure which provides **[25th June 2019-IInd Shift]**
(a) repeatability and accuracy
(b) punctuality and accuracy
(c) accuracy and speed
(d) speed and repeatability

59. When results obtained in a research study can be extended to a group larger than the Sample (outside the context of the study) it is called **[2nd Dec. 2019-Ist Shift]**

(a) Internal validity (b) Functional relationship
(c) External validity (d) Hypothetical construct

60. Which of the following research formats focusses on hypothesis testing and generalizations'? **[20th June 2019-Ist Shift]**
(a) Experimental and ex-post facto research
(b) Intervention based action research
(c) Phenomenological and narrative research
(d) Case study research

61. The time-frame in which a study explores a situation or problem is also called the: **[26th June 2019-Ist Shift]**
(a) reference period (b) age
(c) longitudinal (d) retrospective time

62. The conceptual framework in which a research is conducted is called a: **[26th June 2019-Ist Shift]**
(a) Synopsis of research (b) Research design
(c) Research hypothesis (d) Research paradigm

63. In grounded theory, researchers collect data using theoretical sampling until theoretical saturation is achieved. This process can he summarized in the following sequence. **[5th Dec. 2019-Ist Shift]**
(a) Sample theoretically decided→Collect data→Analyse data→Theoretical Saturation
(b) General research question→Collect data→Sample theoretically decided→Analyse data→Theoretical Saturation
(c) Sample theoretically decided→General research question→Collect data → Theoretical Saturation
(d) General research question→Sample theoretically decided→ Collect data→Analyse data → Theoretical Saturation

64. Which of the following activities are performed by the researcher in an ethnographic research? **[5th Dec. 2019-Ist Shift]**
(A) Conducts structured interview with the members of the community
(B) Gets immersed in a social setting for an extended period of time
(C) Listens to and engages in conversation
(D) Tries to educate people about the harms of some evil practices
Choose the correct answer:
(a) (A) and (B) only (b) (A) and (C) only
(c) (B) and (D) only (d) (B) and (C) only

65. According to one paradigm of research, following sequence is followed by the researchers:
Theory → Generation of hypotheses → Data collection → Data analysis and results → Hypotheses confirmed or rejected → Revision of theory **[5th Dec. 2019-IInd Shift]**
This way of conceptualizing research is based on which of the following:
(a) Inductive approach (b) Deductive approach
(c) Qualitative approach (d) Interpretative approach

66. At the stage of data analysis, in which quantitative techniques have been used by a researcher, the evidence warrants the rejection of Null Hypothesis (H_0). Which of the following decisions of the researcher will be deemed appropriate? **[6th Dec. 2019-IInd Shift]**
(a) Rejecting the (H_0) and also the substantive research hypothesis
(b) Rejecting the (H_0) and accepting the substantive research hypothesis
(c) Rejecting the (H_0) without taking any decision on the substantive research hypothesis
(d) Accepting the (H_0) and rejecting the substantive research hypothesis

HINTS & EXPLANATION

1. (b) Research is the systematic process of solving an identified problem by means of investigation into materials and sources (to establish facts and reach new conclusions) or experimentation aimed at the discovery/ revision/ interpretation of facts, accepted theories or laws.

2. (b) Refer to answer 1 above.

3. (c) Objectives are neither written as complete statements nor as questions. They are given as the following examples—To develop a strategy for reducing pollution by a particular enterprise OR To describe the habitat of the box jellyfish, etc.

4. (d) The recognised qualities of a researcher are:
- Curiosity
- Analytical mind
- Intelligence
- Quick thinking (He must be of alert mind)
- Keen observation (Keenness in enquiry)
- Commitment
- Ability to stay calm
- Objectivity
- Focussed (Unison with that of which he is in search)
- Congeniality with respondents

It is against research ethics to make assertions prior to evidence collected.

5. (a) Research objectives are statements which are to be verified, rather than questions to be answered.
A research variable is a quantity or quality that varies; an independent variable is manipulated to affect the dependent variable that is studied.
A research problem is different from a variable. It is an area of concern that needs meaningful understanding and deliberate investigation.

6. (b) Only this group includes prerequisites common to all kinds of research.
Laboratory skills are required only in experimental research; pre-conceived notions are not acceptable in any research; flexible thinking and archives are not part of scientific research.

7. (a) Research methodology encompasses the specific procedures or techniques used to systematically and logically identify, select, process, and analyze information about a subject topic and solve the research problem. The research methodology undertaken in a research is the determinant of its validity and reliability.

8. (d) All the above

Research objectives describe what the study is expected to achieve, and are usually expressed as the statement of purpose or associated with the hypothesis in a language easily discernible to a lay person. Research objectives are stated in the very beginning, in the first chapter itself.

Analytical ability is not a prerequisite for any research. A researcher only has to follow the research methodology/design and use the prescribed techniques to complete a study successfully.

Variability is the extent to which data points in a statistical distribution or data set diverge from the average, or mean, value as well as the extent to which these data points differ from each other. There are four commonly used measures of variability: range, mean, variance and standard deviation. Research is oriented towards solving the problem of variability.

9. (a) IV, II and I

The main task of **Basic research** is knowledge expansion. **Applied research** analyzes and solves real-life problems. **Problem-oriented research** understands the exact nature of the problem to find out relevant solutions. **Qualitative research** conducts inquiry for an in-depth understanding of the problems or issues in their natural settings. **Quantitative Research** analyzes collected statistical data to draw conclusions. **Descriptive Research** throws more light on current issues through a process of data collection. **Exploratory research** lays the foundation for more conclusive research. **Explanatory research** or causal research conducts experiments to understand the impact of certain changes in existing standard procedures.

Thus, the main tasks of research are to keep pace with the advancement of knowledge, discover new knowledge through a systematic and objective examination and critical analysis of the investigations/ sources/data collected.

10. (a) To bring out holistic approach to research

Interdisciplinary research is defined as a holistic approach of research "that integrates information, data, techniques, tools, perspectives, concepts, and/ or theories from two or more disciplines or bodies of specialized knowledge to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline or area of research practice".

11. (b) objectives of the research

Research objectives, stated as the statement of purpose, or linked with the hypothesis, in the initial chapter of a research paper/thesis, describe what the study expects to achieve. They are the pointers to the importance of the research problem and the efficacy of the advancement in knowledge the study claims to provide. The expenditure incurred or the time taken in completing the research process has no bearing on the quality or value of the study; nor does the title have any.

12. (d) All the above

The different types of research undertaken by researchers can be classified in different ways:

On the basis of methodology—Experimental, Survey, Historical, Philosophical Research

On the basis of application—Basic, Applied and Action Research

On the basis of logic—Deductive and Inductive Research

On the basis of process—Quantitative and Qualitative Research

On the basis of concept—Conceptual and Empirical Research

On the basis of approach— Descriptive and Analytical Research

13. (d) All of the above

Researchers using scientific method generate hypotheses and test it with data collected (experimental); develop new theories (theoretical); and confirm or reject earlier results (empirical).

14. (c) The report of the findings of a research study is based on the methodology employed to collect information. The methodology described gives clear indication whether the research findings have been objectively reported. Authenticity of a research finding is established by its objectivity.

15. (b) Basic, Pure or Fundamental research has the scientific research aim of updating scientific theories and expounding new principles for better understanding or prediction of natural or other phenomena.

16. (b) Ex post facto research is a quasi-experimental study (without random assignment of participants to conditions, unlike experimental study) examining how an independent variable (the **cause**), present prior to the study in the participants, **affects** a dependent variable.

17. (c) **Field study** is a **non-experimental** method of research carried out in the natural location/ context of the subject of study, rather than in a laboratory or office.

Action research is undertaken for immediate solution or progressive improvement of a problem.

Fundamental research sets principles while applied research utilizes or applies those principles/laws during field study to draw clear ideas about and gain insight into the research problem.

18. (d) All of these

Research is defined as the detailed study of a subject, involving the process of discovering / exploring new information; reaching a new understanding in, or verifying, the old existing knowledge; or, supplying missing link/information in the established knowledge.

19. (b) Action research is initiated to solve an immediate problem or serve as a reflective process of progressive problem solving by a team of individuals who progressively improve the way they address the issues.

20. (b) Experimental research consists in **manipulating** a variable and reading the behaviour of other variable against it.

21. (c) Researchers should remain objective and detached so that their findings are not coloured by their personality, beliefs or values. To attain objectivity, it is imperative to be impartial in sample selection and data collection; to use reliable tests; and to employ valid methods of data collection.

22. (b) Action research is a method of immediate problem solving; or a progressive problem solving by individuals in a team who continue to improve the process as reflected at subsequent stages.

23. (a) Assumption is what is taken for granted, or presupposed, without substantial proof, the research hypothesis being at best a working assumption. While making assumptions as well as inferences based on those assumptions we are generally influenced by our beliefs, customs, mores, etc. All these are part of the cultural background of the society we live in (country).

24. (b) Historical research is a qualitative research which involves examining past events to draw conclusions and make predictions about the future.

25. (d) Developmental research is a study focused on the progressive changes that occur as the process develops.
Descriptive research is concerned with describing the conditions or relationships that are in existence, practices that are prevalent, beliefs, opinions or attitudes that are held, processes that are underway, effects that are being experienced, or trends that are emerging.
Action research is a structured process to identify, examine, and improve aspects of a particular practice or a reflective process of progressive problem solving that enables improvement at every stage.
Philosophical research involves the qualitative process of collection and in-depth critical analysis of extensive narrative data on many variables over an extended period.

26. (c) Research is a process of systematic inquiry that entails collection of data; documentation of critical information; and analysis and interpretation of that data/information, in accordance with suitable methodologies set by specific professional fields and academic disciplines.

27. (c) Action research is either a research initiated to solve an immediate problem or a reflective process of progressive problem solving led by individuals working with others in teams or as part of a "community of practice" to improve the way they address issues and solve problems.

28. (c) Applied research is a form of systematic inquiry used for solving practical problems and generally employs empirical methodologies involving the practical application of existing research theories, knowledge, methods, and techniques.
While Basic research or Fundamental research aims to improve scientific theories for improved understanding or prediction of natural or other phenomena; Action research is undertaken to solve an immediate problem.

29. (b) Research process is a systematic activity done in steps. Action research is oriented towards problem solving. Trial and error is the process of experimenting with various methods of doing something until one finds the most successful.
As one is likely to judge facts and events in empirical research depending on one's own predetermined views and personal values which might distort research, research ethics emphasize on objectivity in all observation. So, objective observation is a concern of research ethics rather than research process.

30. (c) Experimental Research
Experimental research includes a variable that can be manipulated by the researcher, and variables that can be measured, calculated and compared in a controlled environment. The control condition desists from any treatment or manipulation of the independent variable. People assigned to the control group serve as the basis of comparison for the people in the experimental condition. Assuming that the groups were comparable prior to the treatment, any difference between the control condition and the experimental condition can be attributed to the effect of the independent variable.
Descriptive research describes a situation, subject, behaviour, or phenomenon.
Historical research involves studies and interprets past events to gain insights into, or arrive at conclusions on, past figures and/or occurrences.
Survey research encompasses collecting information about a population of interest through procedures that involve asking questions of respondents.

31. (d) The aim/ purpose of research is to obtain new knowledge or deepen/expand/reinterpret understanding of an area of knowledge. Observation and scientific research lead to a hypothesis about certain phenomenon, which is then rigorously tested and proved true, which leads to the development of a theory. Research is also done with the aim of obtaining academic degrees.

32. (d) The top skills of a researcher are:
- Spirit of free enquiry
- Reliance on observation and evidence
- Systematization or theorizing of knowledge
- Communication
- Attention to detail
- Critical thinking
- Technical skills
- Statistical and Graphical Analysis of Data
- Ability to maintain quality, safety and infection control standards
- Planning and scheduling
- Interviewing

33. (a) Action research
Action research uses techniques of social and psychological research and is initiated to identify and solve an immediate social problem in a group or community with active group participation of the investigators.

34. (a) The research is carried out after the incident
Ex post facto is a Latin term meaning 'after-the-fact'. Investigation in ex post facto research starts after

the fact has occurred without any interference from the researcher. This research design is often applied when it is not practical or ethically acceptable to manipulate the characteristics of human participants in social research; or, to apply the full protocol of a true experimental design.

35. (a) Information Society is a term for a society in which the creation, distribution, and manipulation of information has become the most significant economic and cultural activity.
An Information Society may be contrasted with societies in which the economic underpinning is primarily Industrial or Agrarian.

36. (b) The principles of fundamental research are used in applied research.

37. (d) The goal of the research process is to produce new knowledge or deepen understanding of a topic or issue and to discover new facts or to make fresh interpretation of known facts.

38. (d) Constructivism and interpretativism are related concepts that address understanding the world as others experience it. Max Weber and Georg Simmel introduced interpretive paradigm into sociology with respect to an outside observer of a culture (such as an anthropologist or sociologist) relating to an indigenous people or sub-cultural group with the group's perspective of understanding meaning in a natural setting, rather than interpreting them in terms of his or her own culture.
Positivism holds observation and reason as means of understanding human behaviour as true knowledge is based on experience of senses and can be obtained by observation and experiment.
Critical paradigm describes a situation from a particular vantage point or set of values. It looks to question the 'natural' state; challenge the mechanisms for order maintenance; and, change the situation.

39. (c) The American physicist and philosopher Thomas Kuhn (1922-1996) propounded the concept of 'paradigm shift' (also radical theory change), marking a fundamental change in the basic concepts and experimental practices of a scientific discipline.

40. (c) Social Research is a research method used by social scientists and researchers to learn about particular population of people and societies so that customised products/services may be designed to cater to their various needs. Various aspects of human behaviour need to be addressed in order to understand their thoughts and gather feedback about the social world, which can be done using Social Research; and, this cannot be done by harbouring any pre-conceived notions.
Therefore, when planning to do a social research, it is better to approach the topic with an open mind, without prejudices, preconceptions, or bias.

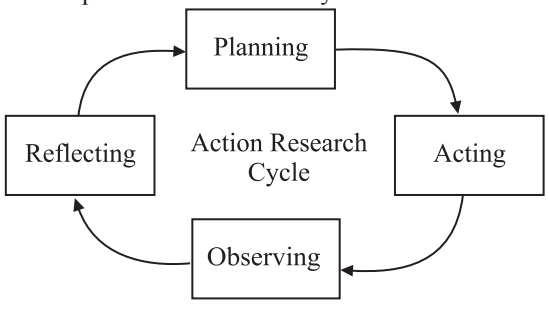
41. (d) Research design refers to the systematic framework of methods and techniques and various components of research adopted by a researcher to solve a research problem. It guides the researcher to answer research questions by synchronization with identified components and data and reach a plausible outcome.

42. (a) Fundamental research has the scientific research aim to improve scientific theories for improved understanding or prediction of natural or other phenomena. Piaget developed his theory of cognitive development on the basis of his Fundamental research on the nature and development of human intelligence. The theory explains how a child constructs a mental model of the world. Piaget disagreed with the idea that intelligence was a fixed trait, and regarded cognitive development as a process which occurs due to biological maturation and interaction with the environment. Piaget proposed four stages of cognitive development: the sensorimotor, preoperational, concrete operational and formal operational period. Albert Einstein called Piaget's discovery "so simple only a genius could have thought of it."

43. (d) (A), (B), (C) and (D)
All of the four statements regarding the meaning of research are correct.

44. (a) Generalization is an act of reasoning that involves drawing broad inferences from particular observations in quantitative research, but is more controversial in qualitative research. The goal of most qualitative studies is not to generalize but rather to provide a rich, contextualized understanding of some aspect of human experience through the intensive study of particular cases.
The four types of quantitative research are Survey (Descriptive), Correlational, Causal comparative (Ex post facto) and Experimental.
Experimental research involves a hypothesis, a variable that can be manipulated by the researcher, and variables that can be measured, calculated and compared in a controlled environment.
Causal comparative research seeks to find relationships between independent and dependent variables after an action or event has already occurred.
Descriptive research describes situations; it does not make accurate predictions, nor does it determine cause and effect.
Historical research is a qualitative research that examines past events to draw conclusions and make predictions about the future.

45. (b) The steps of action research cycle are shown below.



46. (c) Fundamental research involves the scientific research method that aims to improve scientific theories for improved understanding or prediction of natural or other phenomena.
Applied research is a methodology used to solve a

specific, practical problem of an individual or group. It is used in business, medicine and education to find solutions that may cure diseases, solve scientific problems or develop technology.

Action research is either research initiated to solve an immediate problem or a reflective process of progressive problem solving led by individuals working with others in teams or as part of a "community of practice" to improve the way they address issues and solve problems.

Experimental research is performed in a controlled environment strictly adhering to a scientific research design. It includes a hypothesis, a variable that can be manipulated by the researcher, and variables that can be measured, calculated and compared.

47. (d) Plan, Act, Observe, Reflect

Action research is done to find a solution to a practical problem; it is a cycle of action plan, actual action, observation of the outcome and reflection on it; so that corrective action or steps for improvement can be taken.

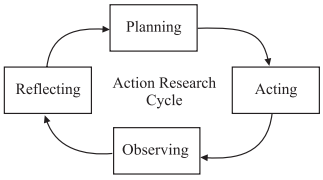
48. (a) (a-ii) (b-iv) (c-iii) (d-i)

By definition, Fundamental research is theory and explanation: Applied research seeks to solve specific, existing problems by exploring use of theory in various situations; Action research seeks to find solution of a practical problem through interventions; Evaluative research uses standard social research methods for evaluative purposes, i.e., to find the extent of perceived impact of an intervention.

49. (a) (A), (B), (C) and (E)

A research work can be original with or without supervision. Non-requirement of supervision is not a factor on which the originality of a research depends. A topic must be unique and feasible, must have utility, and should be backed by a support system, to qualify as an original research.

50. (b) Action research is a comparative research carried out in the course of an activity or occupation, typically in the field of education with the aim of improving the methods and approach of those involved through the process of doing research and taking action along with simultaneous critical reflection. It is composed of a cycle of plan of action, implementing the plan, observing the effect and reflecting the result of the action.



51. (d) Action research involves self-reflective studies undertaken by participants/professionals in social situations in the course of certain practices, typically in the field of education, to improve not only their understanding of these practices as well as the methods and approach they employ; but also to improve the situations in which these practices are carried out.

52. (d) Historical, philosophical and ethnographic studies are types of qualitative research.

Quantitative studies use numerical data to help generate theories that can be **generalizable** to an entire population of data.

Qualitative studies use different methods to tell a detailed story about a theory or phenomenon by providing a thick, rich description that recreates an event, shares a story, or describes a culture or setting for **interpretation and meaning**.

Historical studies: Requiring systematic collection and evaluation of data to describe, explain, and understand actions or events that occurred sometime in the past.

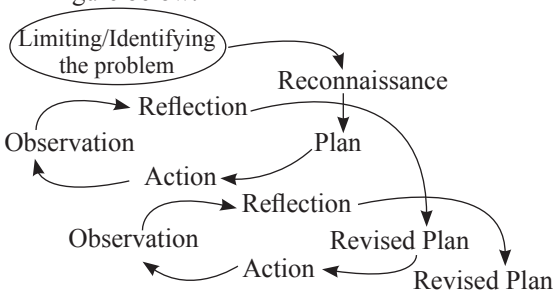
Philosophical studies: Using reflective procedures and such things as ideas and ideals, meanings, lived experience, values, logical relationships, and reasons to shed light on education practices, counselling practices, recreation, exercise, etc.

Ethnographic studies: Involving researchers to completely immerse themselves in the lives, culture, or situation they are studying.

53. (d) The term feminism is attributed to political and sociological theories on issues of gender difference, as well as a movement for gender equality and protection of women's rights and interests. Feminist research, as opposed to traditional **research**, works for the dual objectives of construction of new knowledge and the creation of social equality.

54. (d) "Action research is an individual or collaborative research typically designed and conducted by practitioners who analyze the data to improve their own practice in a cyclic process. In schools, action research refers to a wide variety of evaluative, investigative, and analytical research methods designed to diagnose problems or weaknesses—whether organizational, academic, or instructional—and help educators develop practical solutions to address them quickly and efficiently. In teaching it helps improve effectiveness of specific instructional strategies, the performance of specific students, and classroom management techniques.

55. (c) Action research is a cyclic process as shown in the figure below:



56. (c) Post-positivism was devised as a hybrid of positivism and interpretivism, focussing on researching issues in the context of experiences of the majority and declaring the opinion of the majority as their result.

Phenomenology focuses on experiences, events and occurrences with disregard or minimum regard for the external and physical reality; **Ethnography** is the scientific description of a particular human society, its peoples and cultures, with their customs, practices and diversities through participatory, analytical and comparative field studies; and **Action Research** is a method of systematic enquiry by teachers/researchers into their own practice so as to identify problems and implement corrective measures.

57. (b) Grounded theory (GT) is a research method concerned with the generation/construction of theory 'grounded' in data that has been systematically obtained and analysed using comparative analysis. As in any other research, Concepts, Categories and Hypotheses are the outcomes of grounded theory. Narrative, on the other hand, through its three dimensions of interaction, continuity and situation is the very process for a grounded theory analysis.

58. (a) Research reliability is the degree to which a research method, measurement or instrument produces stable and consistent results if done/used more than once.

59. (c) External validity refers to how generalisable the findings are, which means how well they apply to larger samples of people, or other settings, situations, and time periods.

60. (a) Experimental research is a systematic and scientific approach to research in which the researcher manipulates one or more variables, and controls and measures any change in other variables. An ex post facto research design is a method in which groups with qualities that already exist are compared on some dependent variable. Both these are quantitative research formats that work to test a pre formulated hypothesis and use the data and results to generalize, i.e., extend them to a wider or universal set to draw broad inferences.

Phenomenology, narrative research and case study are qualitative research formats aiming to provide a rich, contextualized understanding of some aspect of human experience through the intensive study of particular cases. They test their hypotheses but do not generalise their results. Action research uses both qualitative and quantitative methods for a self-reflective enquiry aimed at understanding and improving existing practices. This doesn't generalise its results, either.

61. (a) The reference period is the time frame for which survey respondents are asked to report activities or experiences of interest. Many surveys intend to measure frequencies of events or instances within a given period of time. Most of the time, the reference period starts at some point in the past and ends at the time of the survey. However, there are fixed reference periods as well.

62. (b) Research Design is the framework of methods and techniques chosen by a researcher to carry out the complete process of research to tackle/handle the research problem.

A research hypothesis is a specific, clear, and testable proposition or predictive statement about the possible outcome of a scientific research study based on a particular property of a population.

A research paradigm is an appproach/model of research validated and practised by researchers for long.

Research synopsis provides the purpose, rationale, objectives, plan/methods/formats for data collection and analysis to reach your research goals.

63. (d) Grounded theory involves the construction of theories by inductive reasoning, through methodical gathering and analysis of data. Any research begins with the identification of the research question and formulation of a hypothesis. Then the population is defined and the sample is decided. Then the desired data is collected and analysed to test the hypothesis of the research. Based on the findings of the research, generalisation is done and theory is constructed. Grounded theory follows the same procedure.

64. (d) Ethnographic research is a qualitative method where researchers observe and/or interact with a study's participants in their real-life environment. Researchers neither conduct interviews nor try to educate people the harms of some evil practices.

65. (b) This is the deductive approach. Inductive approach goes reverse and looks for patterns and then arrives at generalisation and theorizing. Interpretative approach focuses on analytically disclosing meaning-making practices, while showing how those practices configure to generate observable outcomes. Qualitative approach *focuses on* observation to gather non-numerical data to draw meaning.

66. (b) Like any hypothesis, a substantive hypothesis is an assumption about the relation between two or more variables. It is called substantive for the purpose of distinguishing it from the statistical hypothesis (Null, Alternative) and also because it is not operationalised.

An operationalised hypothesis phrased clearly to show how the variables are manipulated or measured or how the main concepts were put into effect.

In the eventuality of rejection of the Null Hypothesis after quantitative data analysis, the substantive research hypothesis should be accepted.

CHAPTER 8

Methods of Research

RESEARCH METHODS AND DATA COLLECTION METHODS/TOOLS/INSTRUMENTS

I. FIELD STUDIES

Field studies collect authentic/unconventional data for a specific purpose via face-to-face interviews, surveys, or direct observation. Therefore, it is considered as an initial form of research not valid for generalisation. The process starts with identifying the data/phenomena to observe so that a hypothesis or theory to explain certain occurrence(s) related to the specified group or phenomena can be formulated. The observations are then scaled/classified to ascertain what to use (and disregard the rest) and rank them on importance. Data analysis to resolve the research or to accept/reject the hypothesis follows next.

II. SOCIOMETRY

This is a qualitative research method for evaluating/measuring social relationships and dynamics. Sociometry traditionally involves conducting a sociometric test on a group to collect and analyse data which will reveal the social dynamics prevailing within. Sociometric test, developed by Moreno and his associates, is a questionnaire seeking the preference of each member of a group to partner/associate with another member for some purpose/activity.

III. CASE STUDY

This is an observational method of research especially used in social science, psychology, anthropology and ecology to evaluate/test theoretical models by applying/using them on real people and in real world situations. A case study is an in-depth examination of an individual; or a social unit (community, cult, tribe, etc.) or event (a geographical shift, natural calamity, etc.). A case study in Psychology involves a clinical analysis and description of an individual with a rare/unusual condition/disorder; or, damage to a specific part/area/region of the brain.

IV. CASE CONTROL STUDIES

Case control studies (or case–referent studies) identify and compare two defined groups—one with the outcome/disease and the other without – on the basis of some supposed causal attribute or risk factor. They are retrospective in nature, surveying/reviewing/observing the past course of events or period of time to make their assessments. The purpose of a case-control study is to investigate whether there is a statistically significant difference between the groups in their rates of exposure to a defined risk factor.

V. COHORT STUDIES

Cohort in terms of a research study refers to a defined set of people observed over a definite period of time. A Cohort study, generally used in medical and social sciences is a(n) observation/survey to estimate the incidence rate, relative risk or absolute risk of a disease in a certain population. The study usually observes two groups— exposed and not exposed— to assess which one develops the disease. The main outcome measure in cohort studies is a risk ratio/relative risk (RR).

VI. SURVEY

Survey, traditionally, was a quantitative method of collecting data from a pre-defined sample population of respondents, who were asked questions relevant to the study/subject with the intention of generalizing the results to a larger population. Today, surveys are a critical source of qualitative data also, providing insights into every field from government and academia to businesses and media.

Models of survey design

i. Longitudinal studies
ii. Cross-sectional studies
iii. Co relational studies

Models of survey data collection

i. Face-to-face surveys
ii. Telephone surveys
iii. Paper and pencil surveys (self-administered)
iv. Online surveys (self-administered)

VII. LONGITUDINAL STUDIES

Longitudinal studies observe, and collect data repeatedly from, the same set of subjects over an extended period of time (months, years, decades) with the aim of assessing the changes developed. In a longitudinal cohort study, the same individuals are observed over the study period. Cohort studies are common in medicine, psychology and sociology.

The greatest disadvantage of longitudinal research is the length of time

VIII. CROSS SECTIONAL STUDIES

One way to reduce the amount of time and the rate of mortality in a developmental study is to assess different age groups simultaneously rather than using the same age group over an extended period of time. A cross sectional study does the same. It can test the same theory for the same time.

It is based on the assumption that the differences between the age groups represent natural development and a longitudinal study would have produced similar results.

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IX. CROSS SEQUENTIAL STUDIES

Cross sequential studies combine the longitudinal and cross sectional methods in order to shorten the length of the research as well as minimize developmental assumptions.

X. CORRELATIONAL STUDIES

Correlational studies involve a non-experimental research method aimed at finding statistical relation between two sets of variables with no influence from any extraneous variable. Correlation can be positive, negative or neutral as determined by a Regression analysis.

XI. OBSERVATION

Observations can be done directly or indirectly with or without the awareness of the subject. Data collection may be done by continuous observation or alternatively, in preset durations as per the requirements of the study.

XII. QUESTIONNAIRE

A questionnaire may have open-ended or close-ended questions or a combination of the two. While closed-ended questions usually provide quantitative data; open-ended questions seek qualitative data and allow respondents to elaborate their thoughts and ideas. A questionnaire may not necessarily be conducted in the form of a survey, but a survey invariably consists of a questionnaire.

XIII. INTERVIEW

Interview involves obtrusive questioning in a **personal** face to face social interaction to generate usable data. The researcher often records interviews or saves a transcript to be analyzed later. Questions in an interview may be closed-ended (providing respondents with a fixed set of responses to choose from), or open-ended (allowing people to express what they think in their own words).

The interviewer must maintain ethical standards with respect to the vulnerability of the respondent(s) and the sensitivity of the topic undertaken.

EXERCISE

1. Match List A with List B and choose the correct answer from the code given below : **[December-2004]**

List A	List B
A. Historical Method	(i) Past events
B. Survey Method	(ii) Vision
C. Philosophical Method	(iii) Present events
D. Experimental Method	(iv) Exceptional cases
	(v) Future action

Codes :

	A	B	C	D
(a)	(i)	(iii)	(ii)	(v)
(b)	(i)	(ii)	(iv)	(v)
(c)	(i)	(iv)	(ii)	(v)
(d)	(i)	(ii)	(iii)	(iv)

2. One of the aims of the scientific method in research is to: **[June-2006]**
(a) improve data interpretation
(b) eliminate spurious relations
(c) confirm triangulation
(d) introduce new variables

3. Which of the following is not a Method of Research? **[December-2006]**
(a) Observation (b) Historical
(c) Survey (d) Philosophical

4. The experimental study is based on: **[December-2007]**
(a) The manipulation of variables
(b) Conceptual parameters
(c) Replication of research
(d) Survey of literature

5. Field-work based research is classified as: **[June-2008]**
(a) Empirical (b) Historical
(c) Experimental (d) Biographical

6. The process not needed in experimental research is: **[December-2008]**
(a) Observation
(b) Manipulation and replication
(c) Controlling
(d) Reference collection

7. The process not needed in Experimental Researches is **[December-2009]**
(a) Observation (b) Manipulation
(c) Controlling (d) Content Analysis

8. The term 'phenomenology' is associated with the process of **[December-2010]**
(a) Qualitative Research (b) Analysis of Variance
(c) Correlational Study (d) Probability Sampling

9. Which of the following variables cannot be expressed in quantitative terms? **[December-2010]**
(a) Socio-economic Status (b) Marital Status
(c) Numerical Aptitude (d) Professional Attitude

10. A doctor studies the relative effectiveness of two drugs of dengue fever. His research would be classified as **[December-2010]**
(a) Descriptive Survey (b) Experimental Research
(c) Case Study (d) Ethnography

11. Which one of the following is a research tool? **[December-2011]**
(a) Graph (b) Illustration
(c) Questionnaire (d) Diagram

12. Newton gave three basic laws of motion. This research is categorized as **[June-2011]**
(a) Descriptive Research
(b) Sample Survey
(c) Fundamental Research
(d) Applied Research

13. Which one of the following is not a type of experimental method ? **[September-2013]**
(a) Single group experiment
(b) Residual group experiment
(c) Parallel group experiment
(d) Rational group experiment

14. Deconstruction is a popular method of research in **[September-2013]**
(a) Basic Science (b) Applied Science
(c) Social Science (d) Literature

15. The research stream of immediate application is **[June-2014]**
(a) Conceptual research (b) Action research
(c) Fundamental research (d) Empirical research

16. Which of the following statements is not true in the context of participatory research ? **[December-2015]**
(a) It recognizes knowledge as power.
(b) It emphasises on people as experts.
(c) It is a collective process of enquiry.
(d) Its sole purpose is production of knowledge.

17. A researcher is interested in studying the prospects of a particular political party in an urban area. What tool should he prefer for the study ? **[December-2015]**
(a) Rating scale (b) Interview
(c) Questionnaire (d) Schedule

18. A researcher intends to explore the effect of possible factors for the organization of effective mid-day meal interventions. Which research method will be most appropriate for this study? **[July-2016]**
(a) Historical method
(b) Descriptive survey method
(c) Experimental method
(d) Ex-post-facto method

19. In qualitative research paradigm, which of the following features may be considered critical? **[July-2016]**
(a) Data collection with standardised research tools.
(b) Sampling design with probability sample techniques.
(c) Data collection with bottom-up empirical evidences.
(d) Data gathering to take place with top-down systematic evidences.

20. There are two sets given below, Set-I consists of methods of research and Set-II indicates their procedural characteristics.
Match the two sets and choose your answer from the codes given below : **[August-2016]**

Set – I (Research method)	**Set – II (Procedural Characteristics)**
A. Experimental method	i. Interventions to ameliorate a given situation
B. Expost facto method	ii. Explaining patterns of behaviour in terms of meanings and their representations which people share.
C. Descriptive method	iii. Manipulating an independent variable in controlled conditions and measuring its effect on dependent variable.
D. Symbolic interactionism	iv. Depending on primary and secondary sources of data.
E. Action research	v. Obtaining information concerning the current status of phenomena.
	vi. Observing the effect on dependent variable and making probes into factors/variables which explain it.
	vii. Exegetic analysis.

Codes :

	A	**B**	**C**	**D**	**E**
(a)	i	iii	iv	v	vii
(b)	iii	iv	v	vi	vii
(c)	i	ii	iii	iv	v
(d)	iii	vi	v	ii	i

21. Which of the following is not the critical feature of qualitative research? **[August-2016]**
(a) Actual settings are the direct source of data.
(b) Data take the forms of words or pictures.
(c) Seeking to establish relationships among measured social facts.
(d) Researcher becomes immersed in the situation, present or past related to the phenomena.

22. Below are given two sets–research methods (Set-I) and data collection tools (Set-II). **[January-2017]**
Match the two sets and indicate your answer by selecting the correct code :

Set – I (Research Methods)
A. Experimental method
B. Ex post-facto method
C. Descriptive survey method
D. Historical method

Set – II
(Data Collection Tools)
i. Using primary and secondary sources
ii. Questionnaire
iii. Standardized tests
iv. Typical characteristic tests

Codes :

	A	**B**	**C**	**D**
(a)	(ii)	(ii)	(iii)	(iv)
(b)	(iii)	(iv)	(ii)	(i)
(c)	(ii)	(iii)	(i)	(iv)
(d)	(ii)	(iv)	(iii)	(i)

23. A researcher attempts to evaluate the effect of method of feeding on anxiety - proneness of children. Which method of research would be appropriate for this ? **[November-2017]**
(a) Case study method (b) Experimental method
(c) Ex-post-facto method (d) Survey method

24. Match List-I (Interviews) with List-II (Meaning) and select the correct answer from the code given below: **[November-2017]**

List - I (Interviews)	**List - II (Meaning)**
A. structured interviews	(i) greater flexibility approach
B. Unstructured interviews	(ii) attention on the questions to be answered
C. Focused interviews	(iii) individual life experience
D. Clinical interviews	(iv) Pre determined question
	(v) non-directive

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Code:

	A	B	C	D
(a)	(iv)	(i)	(ii)	(iii)
(b)	(ii)	(iv)	(i)	(iii)
(c)	(v)	(ii)	(iv)	(i)
(d)	(i)	(iii)	(v)	(iv)

25. Which one of the following is the main feature of qualitative research? **[20th June 2019-Ist Shift]**
(a) Avoids positivist assumptions and data analysis.
(b) Subscribes to preexisting categories.
(c) Collects data in numerical form.
(d) Uses empirical method of data analysis.

26. From the following list identify the qualitative research characteristics and select your answer from the codes given below: **[20th June 2019-IInd Shift]**
(1) Creating purpose statements and research questions.
(2) Stating the purpose and research questions in a broad way.
(3) Collecting data based on words from a small number of individuals.
(4) Collecting numeric data and statistical analysis.
(5) Using text analysis and Interpreting larger meanings of the findings.

Code:
(a) (2), (3) and (5) (b) (1), (2) and (3)
(c) (1), (2) and (4) (d) (1), (3) and (5)

27. Case studies are: **[20th June 2019-IInd Shift]**
(a) Studies conducted in areas of genetics and microbiology.
(b) In-depth examination of a subject and its related conditions.
(c) A report on the existing sociopolitical condition.
(d) Specialized research in the areas of health and sanitation.

28. Participant observation is a part of: **[21st June 2019-Ist Shift]**
(a) Philosophical research
(b) Mentalist Theory of language
(c) Mathematical research
(d) Ethnographic research

29. Through which research method, the manipulation of an independent variable and its effect on dependent variable is examined with reference to a hypothesis under controlled conditions? **[24th June 2019-Ist Shift]**
(a) Ex-post facto research (b) Descriptive research
(c) Case study research (d) Experimental research

30. The study of 'why does stressful living result in heart attack'? can be classified as: **[24th June 2019-IInd Shift]**
(a) Descriptive research (b) Explanatory research
(c) Correlational research (d) Feasibility research

31. In the research method, generalisations may be made that will be applicable to other situations of the same type. What is this called? **[25th June 2019-Ist Shift]**
(a) Cohort study (b) Case study
(c) Panel study (d) Blind study

32. Quantitative research is also called the **[25th June 2019-Ist Shift]**
(a) Ethnographic approach (b) Unstructured approach
(c) Descriptive approach (d) Structured approach

33. When the researcher does not know the identity of the experimental and placebo groups, the study is termed as **[25th June 2019-Ist Shift]**
(a) Blind (b) Double - blind
(c) Panel (d) Cohort

34. The easiest attitudinal scale which is a summated rating scale is the **[25th June 2019-Ist Shift]**
(a) Guttman Scale (b) Likert scale
(c) Thurstone scale (d) MLA scale

35. Brainstorming as a method can be used for **[25th June 2019-IInd Shift]**
(a) Out-of-box thinking
(b) Coherent thinking
(c) Generating new ideas in the area of interest
(d) Critical thinking

36. A pilot study is also called a **[25th June 2019-IInd Shift]**
(a) descriptive study (b) feasibility study
(c) correlation study (d) explanatory study

37. A questionnaire that offers no scope for any respondent's own view is called **[25th June 2019-IInd Shift]**
(a) closed-ended (b) schedule
(c) open-ended (d) unstructured

38. In which of the following research paradigms the focus of concern is on interpreting reality in terms of participants perspective? **[26th June 2019-IInd Shift]**
(a) Experimental Research (b) Ex-post facto Research
(c) Ethnographic Research (d) Survey Research

39. A university department plans to undertake a study wherein attitudes, values and biases of teachers and students are to be probed with an eye on disclosing their patterns of adjustment. Which types of research methods will be considered appropriate in this context? **[2nd Dec. 2019-Ist Shift]**
(i) Experimental method
(ii) Case study method
(iii) Descriptive method
(iv) Ethnographic method
(v) Historical method
Select the correct answer from the options given below:
(a) (i) and (ii) (b) (ii) and (iii)
(c) (iii) and (v) (d) (ii) and (iv)

40. A university teacher intends to study the relationship between level of aspiration and achievement of rural children. Which design of research will be most appropriate in the context? **[3rd Dec. 2019-Ist Shift]**
(a) Experimental research design
(b) Ex Post Facto research design
(c) Historical research design
(d) Survey research design

41. In which of the following research methods. an empirico-inductive paradigm is employed? **[3rd Dec. 2019-IInd Shift]**
(A) Ethnograpic Probe (B) Case study method
(C) Ex post facto method (D) Narrative method
(E) Experimental method
Select your answer from the options given below :

(a) (A), (B) and (C) (b) (B), (C) and (D)
(c) (A), (B) and (D) (d) (C), (D) and (E)

42. A university teacher plans to improve the study habits of students in his/her class. Which type of research paradigm will be helpful in this regard? **[4th Dec. 2019-Ist Shift]**
(a) Evaluative research paradigm
(b) Fundamental research paradigm
(c) Applied research paradigm
(d) Action research paradigm

43. Which among the following is **NOT** related to qualitative research? **[4th Dec. 2019-IInd Shift]**
(a) Thematic analysis (b) Case study
(c) Discourse analysis (d) Survey method

44. A college teacher does research with a view to depict the reality situations relating to home conditions of students and hostels provided for. Which of the following research format will be helpful to do so? **[6th Dec. 2019-Ist Shift]**
(a) Experimental Research
(b) Descriptive Research
(c) Participant observation based research
(d) Ethnographic Research

45. In an intervention based action research process, which of the following is the usually recommended sequence? **[6th Dec. 2019-IInd Shift]**
(a) Plan, Act, Observe and Reflect
(b) Observe, Plan, Act and Reflect
(c) Reflect, Plan, Act and Observe
(d) Observe, Act, Reflect and Plan

46. Generalised conclusion on the basis of a sample is technically known as:
(a) Data analysis and interpretation
(b) Parametr inference
(c) Statistical inference
(d) All of the above

47. Which of the following steps are required to design a questionnaire? **[6th Dec. 2019-IInd Shift]**
(A) Writing primary and secondary aims of the study.
(B) Review of the current literature.
(C) Prepare a draft of questionnaire.
(D) Revision of the draft.
Select the correct answer from the codes given below:
(a) (A), (B) and (C) (b) (A), (C) and (D)
(c) (B), (C) and (D) (d) (A), (B), (C) and (D)

48. From the list given below identify those questions which are called process rather than content-based questions? **[26th June 2019-Ist Shift]**
(i) Convergent questions
(ii) Divergent questions
(iii) Fact based questions
(iv) Concept based questions
(v) Open questions
(vi) Closed questions
Choose the correct answer from the options given below:
(a) (i), (ii) and (iii) (b) (ii), (iii) and (iv)
(c) (iv), (v) and (vi) (d) (ii), (iv) and (v)

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1. (b) (A)-(i); (B)- (ii); (C)-(iv); (D)-(v)
(A) Historical Method - (i) Past events
(B) Survey Method - (ii) Vision
(C) Philosophical Method - (iv) Exceptional cases
(D) Experimental Method - (v) Future action

2. (b) eliminate spurious relations
A spurious relationship or spurious correlation is a statistical relationship wherein two events/variables that actually have no direct causal connection are inferred to be related due to either coincidence or the presence of a certain third, unseen factor. One of the aims of scientific/experimental/causal research is to eliminate spurious relationships.

3. (a) Practical Research, or hands on empirical study includes experiments, questionnaires, surveys, interviews, and discussion groups.
Theoretical Research or non empirical perusal of published works, available in academic journals or archives of public libraries, court rooms, includes historical and philosophical research.
Observation pertains to systematic data collection by using all human senses to examine people in natural settings or naturally occurring social situations. It is not a Method of Research.

4. (a) Experimental research comprises manipulating an independent variable and studying the behaviour of a dependent variable against it.

5. (a) Empirical research is the method of gaining and verifying knowledge by means of direct and indirect observation or experience i.e. outside lab, library, workplace, etc., rather than by theory or logic. Empirical evidence (the record of one's direct observations or experiences) can be analyzed quantitatively or qualitatively.

6. (d) Experimental research includes manipulation of a variable and observing the behaviour of the dependent variable(s) in a controlled environment. An experimental study is sometimes replicated to determine if the basic findings of the original study can be applied to other participants and situations.
Reference Collection refers to collecting references like encyclopaedias, dictionaries, etc., that will provide answers to specific queries in any field of research.

7. (b) Experimental research investigates a hypothesis through experiments wherein a variable is **manipulated** against which the behaviour of other variables is **observed**, measured, calculated and compared in a **controlled** environment.
Content analysis is a research technique used to make replicable and valid inferences by interpreting and coding textual material. It is not used in experimental research.

8. (c) Phenomenology or the study of visual perception is a method for explaining phenomena in relation to other phenomena (by the systematic and controlled variation of a phenomenon by an independent variable), sometimes supported by neurophysiology.
A correlational study seeks to understand what kind of relationships naturally occurring variables have with one another. A naturally occurring variable is a variable that has not undergone any manipulation by the researcher.

9. (d) A quantitative variable is that which can be naturally measured on a numeric or quantitative scale (ordinal, interval and ratio scales) as a number, e.g., height, age, crop yield, GPA, salary, temperature, area, air pollution index (measured in parts per million), etc. Variables that cannot be expressed numerically are depicted in categories and termed categorical (qualitative).
Attitude is a qualitative variable, inexpressible in numbers.

10. (b) Experimental research investigates a hypothesis through experiments where a variable can be manipulated against variables that can be measured, calculated and compared in a controlled environment.
Ethnography is the scientific description of peoples and cultures with their customs, habits, and mutual differences. Case study is especially used in social science, psychology, anthropology and ecology to test theoretical models by using them in real world situations. Descriptive research describes a situation, subject, behaviour, or phenomenon.

11. (c) Questionnaire
Anything used for the purpose of collecting information for a research study is called a research tool/instrument, e.g., Questionnaire, Interview, Scale, Test, Inventory, Observation, Atlas, Internet, Software, etc.
Graph, illustration, and diagram are means of depicting research data/outcome.

12. (c) Fundamental research is an experimental or theoretical work driven by curiosity and performed with a scientific approach to obtain new knowledge, or expand existing knowledge on observable phenomena or facts, without prior consideration that it will result in any practical application or use.

13. (b) Experimental designs can be single- group, three-group, four- group, parallel -group, counter balanced or Latin-group, rational group.
Residuals are estimates of experimental error obtained by subtracting the observed response from the predicted response.

14. (d) Deconstruction is a form of philosophical and literary analysis, derived mainly from French philosopher Jacques Derrida's 'Of Grammatology'; its three key features are: (i) the inherent desire to have a centre, or focal point, to structure understanding (logocentrism); (ii) the reduction of meaning to set definitions that are committed to writing (nothing beyond the text); and, finding how the reduction of meaning to writing captures opposition within that concept itself (différance).

15. (b) "Action research is focused on the immediate application and not on the development of theory. It has placed its emphasis on a real problem in a local setting. Its finding are to be evaluated in terms of local applicability, not in terms of universal validity"

16. (d) The sole purpose of research is not production of knowledge. Research involves systematic investigation of phenomena, the purpose of which could be for:
- discovering, uncovering, exploring (Exploratory)
- gathering information, describing, summarizing (Descriptive)
- Testing theory and understanding causal relations (Explanatory)
- predicting what might happen in various scenarios (Predictive)

17. (c) A **questionnaire** is a research instrument consisting of a series of questions (or other types of prompts) for the purpose of gathering information from respondents. So,
A **schedule** is a structure of a set of questions on a given topic which are asked by the interviewer or investigator personally. Close-ended questions have to be answered by the respondent by choosing an answer from the set of answers given under a question just by ticking.
A **rating scale** is a method that requires the rater to assign a value, sometimes numeric, to the rated object, as a measure of some rated attribute.
An **interview** involves 'conducting intensive individual interviews with a small number of respondents to explore their perspectives on a particular idea, program or situation.'
Therefore, questionnaire is the best way to study the political prospects of a party.

18. (d) Ex post facto is a quasi-experimental study design examining how an independent variable, present prior to the study in the participants, affects a dependent variable. A quasi- experimental study simply means participants are not randomly assigned.
Historical method uses primary sources and other evidence, including the evidence of archaeology, to research and then to write histories in the form of accounts of the past.
Descriptive research describes situations. They do not make accurate predictions, and they do not determine cause and effect.
Experimental research is a quantitative research method conducted with a scientific approach, where a set of variables are kept constant while the other set of variables are being measured as the subject of experiment.

19. (c) Data collection with bottom-up empirical evidences.
It describes**,** either explicitly or implicitly, the purpose of the qualitative research, the role of the researcher, the stages of research, and the method of data analysis. Data collection with bottom-up empirical evidences is considered critical in qualitative research paradigm.

20. (d) A. Experimental method iii. Manipulating an independent variable in controlled conditions and measuring its effect on dependent variable

B. Expost facto method vi. Observing the effect on dependent variable and making probes into factors/variables which explain it

C. Descriptive method v. Obtaining information concerning the current status of phenomena

D. Symbolic interactionism ii. Explaining patterns of behaviour in terms of meanings and their representations which people share

E. Action research i. Interventions to ameliorate a given situation

21. (c) Seeking to establish relationships among measured social facts.

Qualitative researchers study deeply things in their natural settings, attempting to interpret phenomena in terms of how people perceive their social realities and act within the social world. Actual settings are their direct source of data which may be in the form of words or pictures.

22. (b) The research methods and data collection tools match as shown below:

Experimental method – Standardized tests

Ex post-facto method – Typical characteristic tests

Descriptive survey method – Questionnaire

Historical method – Using primary and secondary sources.

23. (c) Ex post facto is a quasi-experimental study examining how an independent variable, present prior to the study in the participants, affects a dependent variable. A quasi-experimental study is one where participants are not randomly assigned.

Case study refers to a qualitative, detailed study combining both objective and subjective data of an individual or a small group of individuals. Case study research focuses narrowly on exploration and description of a phenomenon to achieve an in-depth understanding.

Survey is a research method used for collecting data from a pre-defined group of respondents to gain information and insights on various topics of interest. Surveys have a variety of purposes and can be carried out in many ways depending on the methodology chosen and the objectives to be achieved.

Experimental research (see ans. 6)

24. (a) (A) (iv); (B) (i); (C) (ii); (D) (iii)

Structured interviews - Pre determined question

Unstructured interviews - greater flexibility approach

Focused interviews - attention on the questions to be answered

Clinical interviews -individual life experience

A structured interview (or standardized interview or researcher- administered survey) is a quantitative research method of asking a set amount standardized questions in the same order commonly employed in survey research. An unstructured or non-directive interview is its opposite in which a flexible variety of different open ended questions are asked.

Focused (Semi-structured) Interview allows a respondent to voice their opinions on a particular subject to reach a definite conclusion related to taboos/ problems/performances, etc.

A clinical interview asks personal questions to make an accurate diagnosis of a variety of illnesses affecting conscious or unconscious state of human mind to initiate corrective therapy.

25. (a) Qualitative research collects and works with non-numerical data to study targeted populations or places and seeks to interpret meaning from these data. Quantitative research, on the other hand, uses data analysis of numerical data with positive assumptions for determining causal and correlative relationships between variables.

26. (a) Qualitative research focuses on obtaining data through open-ended and conversational communication. It states the purpose and research questions in a broad way; collects data based on words from a small no of individuals, undertakes text analysis and interprets larger meanings of the findings.

27. (b) Case studies are

A case study is a research strategy involving an in-depth holistic investigation, empirical inquiry or descriptive/exploratory analysis of persons, groups, phenomena, decisions, periods, policies, institutions or other systems within real-life context.

28. (d) As per the mentalist theory, language is internal, rule-governed, and abstract and humans have an innate ability to process language input (as observed in a child's learning of native language) which deteriorates with physical maturity. In terms of second language acquisition, the mentalist theory prescribes revaluation of present classroom procedures and material with greater emphasis on the student's "competence" as opposed to their "performance."

Philosophical research considers a philosophical question from all perspectives by examining conceptual meaning, raising further questions, proposing answers and suggesting the implications of those answers, making values manifest, identifying ethics, and studying the nature of knowledge.

Mathematical research relies heavily on logic and a specific type of language, including symbols and regimented notation. Authors must apply a strict logical construct when writing a mathematic research paper.

Ethnographic research is a qualitative method where researchers observe and/or interact with a study's participants in their real-life environment.

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Ethnography was popularised by anthropology, but is used across a wide range of social sciences. Participant observation, for many years, has been a hallmark of both anthropological and sociological studies.

29. (d) Ex post facto research is a method in which groups with qualities that already exist are compared on some dependent variable.

Descriptive research is a research method that describes the characteristics (the 'what') of the population or phenomenon that is being studied rather than the problem (the "why") of the research subject.

Case study, commonly used in social sciences, is a research strategy and an empirical inquiry that investigates a phenomenon within its real-life context.

Experimental research is a quantitative research conducted with a scientific approach, in which the researcher manipulates one or more (independent) variables under controlled conditions and measures/ examines any change/effect in other (dependent) variables.

30. (b) The purpose of explanatory research is to increase the understanding of a researcher on a certain subject. It does not provide conclusive results for want of statistical data but makes the researcher determine the **how** and **why** of the subject under study; or, build/ elaborate /extend/ test existing theory.

31. (b) A case study is an intensive research into a unit/entity, which is aimed to **generalize** over several other.

A cohort study samples a cohort or a group of people who share a defining characteristic or a common event in a selected period, such as birth or graduation) performing a cross-section at time intervals.

A panel study collects repeated measures of the same unit of analysis at specified intervals over a long period, often many years.

A blind study is done without the awareness of the subjects to the treatment they are receiving in order that the results are not affected by a placebo effect (the power of suggestion).

32. (d) **Quantitative** research involves a systematic investigation of phenomena or testing of objective theories by collecting quantifiable data and examining the relationship among variables with statistical/ mathematical/computational techniques. The research report has a defined **structure** consisting of introduction, literature and theory, method of data collection and analysis and conclusion.

Ethnographic research is a **qualitative** method where researchers observe and/or interact with a study's participants in their real-life environment.

Unstructured approach involves **qualitative** data collection by putting variable questions to different candidates..

Descriptive research is generally **a qualitative** method of observing and describing the behaviour of a population/subject without influencing/varying it in any way. It cannot be used for experimental quantitative research.

33. (b) Double-blind study is that in which the participants as well as the researchers are unaware about who is receiving a particular treatment. Such studies are particularly useful for preventing bias due to demand characteristics or the placebo effect.

34. (b) Likert scale: Respondents indicate the extent of their agreement with each item on a scale (e.g., a five- or-seven point scale). Their score is the **sum** of the scores for each item on the scale.

Guttman scale: The researcher prepares a set of statements reflecting an increasing intensity of attitude relating to the concept under study. Starting at the base, the statement with which the respondent disagrees reflects his/her scale position.

A Thurstone scale: It consists of statements (with a certain ascribed value each) with which the respondent has to agree or disagree; and only those with which they agree are scored. The respondent's score on the scale corresponds to the median score of the items with which he/she agrees.

MLA is not a scale but a format of writing research paper/thesis.

35. (c) Brainstorming is a method for generating new ideas in a free-thinking environment to solve a problem. It usually involves a group, under the direction of a facilitator. Participants potentially draw associations between their ideas, thereby broadening the solution space.

36. (b) A pilot study is a small scale preliminary study conducted in order to evaluate feasibility of an approach or key steps that is intended to be used in a future, full-scale project.

37. (a) Structured or closed-ended questionnaires have pre-decided definite questions for which only degree of approval or disapproval is sought from the respondents. It has no scope for respondents' own views.

38. (c) Ethnographic research is a type of qualitative research in which researchers observe and/or interact with the participants in their real-life environment; and data is collected from observations, interviews and documents to produce detailed and comprehensive accounts of different social phenomena.

39. (d) Case study method of research involves a careful, in-depth and complete observation of a person, family, institution, cultural group or even the entire community; and, Ethnographic method involves observation and/or interaction with the study's participants in their real-life environment.

So, both these methods will be appropriate in the given context. The other methods are for other specific purposes: *Experimental method* is scientific research method of manipulating one or more variables, and measures corresponding change in other variables; *Descriptive research* focuses on describing the nature of a demographic segment or phenomenon that is being studied, rather than finding out the cause/reason behind its occurrence; *Historical research* involves studying, understanding and interpreting past events by interpretation of documents, diaries and other historical data (primary or secondary sources).

40. (b) Ex-post facto research examines how an independent variable or a quality that is present in participants prior to the study affects some dependent variable. The participants are grouped on the basis of a particular

characteristic or trait (variable) that is of interest to the researcher; here, level of aspiration of the children. The dependent variable to be measured for the effect will be the level of achievement of the children.

41. (c) An ex post facto research design is a method in which groups with qualities that already exist are compared on some dependent variable. It is considered quasi-experimental because the subjects are not randomly assigned - they are grouped based on a particular characteristic or trait. It is empirical as it is verifiable by observation/experience rather than theory. It is inductive as it collects data, analyzes patterns in the data, and then theorizes from the data. This is evident from its very name, which means 'after the fact'.

42. (d) Action research is a methodology of research that seeks transformative change through the process of action, critical reflection and research through the following steps/cycle until the goal is attained.

- Identify a problem to be studied
- Collect data on the problem
- Organize, analyze, and interpret the data
- Develop a plan to address the problem
- Implement the plan
- Evaluate the results of the actions taken
- Identify a new problem
- Repeat the process

43. (d) Survey Research is the most fundamental tool for all **quantitative** research methodologies and studies. Surveys are used to seek responses to questions from a sample of respondents. The various types of survey are online polls, online surveys, paper questionnaires, web-intercept surveys, etc.

Thematic analysis is a method of analyzing qualitative data. It is usually applied to a set of texts, such as interview transcripts.

Discourse analysis is a common qualitative research method in many humanities and social science disciplines, including linguistics, sociology, anthropology, psychology and cultural studies; for studying written or spoken language in relation to its social context. It aims to understand how language is used in real life situations.

Case study is a qualitative research method commonly used in social sciences. It is an in-depth, exploratory empirical investigation/analysis of a single individual, group, event or phenomenon within its real-life context to describe the causes of underlying principles. A case study research relies on multiple sources of evidence and benefits from the prior development of theoretical propositions.

44. (c) **Participant observation** is a qualitative research method in which the researcher not only observes the research participants, but also actively engages in the activities of the research participants.

The college teacher in this case will be able to effectively depict the reality situations relating to home conditions of students and hostels provided for only by being with them, actively engaging with them in their activities, and simultaneously observing their behaviours.

Experimental research strictly adheres to a scientific research design. It investigates a hypothesis through experiments in a controlled environment where a variable can be manipulated by the researcher against variables that can be measured, calculated and compared

Descriptive research describes a situation, subject, behaviour, or phenomenon.

Ethnographic research is the scientific description of a particular human society, its peoples and cultures, with their customs, practices and diversities through participatory, analytical and comparative field studies.

45. (a) Intervention based action research is a specific type of action research that adopts a critical approach towards processes/practices and aims for improvements. It carries out the stages of planning, action, observation and critical analysis or reflection (based on collected data) on how successful or unsuccessful the process of research was and accordingly repeats the cycle with improved plan and action in order to introduce improvements in relevant practices. This type of research is facilitated by participation and collaboration of number of individuals with a common purpose. The recommended sequence is shown below.

1. Plan
2. Act
3. Observe
4. Reflect

46. (c) Data analysis is a process of inspecting, cleansing, transforming, and modelling data. Statistical inference refers to gleaning information about a population from a sample collected from it. Parameter inference refers to the analyst computing the statistic as an estimate of the parameter (proportion of items of interest in the population.

47. (d) (A), (B), (C) and (D)

Designing a questionnaire involves 10 main steps:

- Write a study protocol
- Draw a plan of analysis
- Draw a list of the information needed
- Design different parts of the questionnaire
- Write the questions
- Decide on the order of the questions asked
- Complete the questionnaire
- Verify the content and style of the questions
- Conduct a pilot study
- Refine your questionnaire

48. (d) Process questions are designed to test the depth of subject knowledge and ability to analyze how the various components (i.e. processes) of a system contribute to create the whole; and are almost always chronological or linear and involve multiple, sequential steps.

They use cue words like describe, list out, explain, analyze, and what is the process/ what are the steps, etc. So, process questions are divergent, concept based, and open.

Content based questions are convergent, fact based and closed questions.

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CHAPTER 9

Steps of Research

PROCESS/ STEPS OF RESEARCH

STEP 1: FORMULATION OF RESEARCH PROBLEM & OBJECTIVES

- Research problem is selected on the bases of the interest and aptitude of the researcher, the *relevance* and *manageability/ attainability* of the study, the *availability* of data, and *ethical issues* involved.
- The researcher zeroes in on a broad area that generates their **interest** and separating its subareas, selects the one focus area on which they would want to take up research.
- Then they scan the selected area to **identify problems/gaps** therein.
- Then they **list all the questions** that they would want to seek answers to.
- From those research questions, they **formulate the general and specific objectives** for which they are to take up research (mentioning the proposed benefits of the research)
- Then they narrow down the research questions and corresponding objectives to an attainable target and **formulate their research problem.**
- Researchers usually also identify, at this stage itself, the specific population they would conduct the research on, so that suitable subjects/respondents may later be selected.

STEP 2: CRITICAL LITERATURE REVIEW

A literature review involves surveying and scanning of books, journals, scholarly articles, and all other sources of information related to the research idea in order to know, and explain in the thesis/paper, how the literature survey relates to the research question and how the research fits within a larger field of study.

5. It traces the informed progression of the field, including major debates and concludes with identification of existing gaps and proposal to fill those with new/additional research.
6. It identifies areas of prior scholarship to prevent duplication of effort.

STEP 3: FORMULATION OF HYPOTHESIS

A **hypothesis** is a concrete verifiable prediction for a specific situation/event/phenomenon. It is a speculation or theory formulated on insufficient evidence that is taken up for experimentation/ verification/ testing so as to be proven true or false It is constructed as a statement of expected results that serves an exploratory purpose in empirical/quantitative research; provides a conceptual framework in qualitative research; and suggests guidelines to address problems that are still in a formative phase in applied research.

The Purpose of a Hypothesis is to define in an experiment the relationship between the independent variable (the cause) which can be controlled /manipulated; and the dependent variable which is the measurable outcome effected by the former.

Characteristics of Hypothesis:

1. It should be very specific, which means the concepts should be explicitly defined so as to leave no ambiguity about what would constitute the empirical evidence or what would indicate the concept on the plane of reality.
2. It should be relevant/ related/ oriented to a body of theory which can be verified, supported, corrected or refuted by the research. In other words, it should explain the theoretic rationale or theoretical gains of testing the hypothesis.
3. It should be empirically testable, which means, it should enable logical deduction/ /inference which can be tested by observation in the field.
4. It should be able to predict an outcome.

STEP 4: PREPARING RESEARCH DESIGN

The research design is prepared after the hypothesis has been formulated and before the process of data collection is started. It is the blueprint of the complete process of the research based on its objectives and outlays the overall framework of the procedures to be followed to answer the research questions. It describes the scope of the study and states the approach/strategy as well as the type (experimental, survey, correlation, semi-experimental, review, etc.) of research. It lists the objectives of the research as well as the benefits it will have. It gives the framework of correlation between the variables and specifies what sampling methods and sample size would be used; what types of data would be collected, from what sources or using what instruments/tools; and, what statistics and technique(s) of data analysis would be employed. At the same time, it explains why all of these specifics have been chosen over the others. It also briefs about the time available and the costs involved for each stage of the research. The name of a research design usually corresponds with the kind of research undertaken.

Characteristics of Research Design

There are four key characteristics of research design:

Neutrality: The result outcome predicted in a research design should be free from any bias.

Reliability: If a particular research is conducted on a regular basis, it should give similar results every time. Only then would it be reliable. So, a research design should inform how the research questions would ensure the consistency of obtained results and therefore, reliability.

Validity: The research design must show how the research instrument/tool, e.g., questionnaire, would be developed to give valid results.

Generalization: The research will be able to give a generalisable result/conclusion.

STEP 5: DETERMINING SAMPLE DESIGN

Sampling refers to taking sample (representative part of a whole) of some population/subjects for a study. Researchers look to obtain information/data pertinent to their study through a survey of a selected sample of a population or universe of interest.

Sample design: It is the framework or road map of the proposed process of sampling, i.e., selecting a survey sample, and has a bearing on several other important aspects of the investigation/ observation. Sampling design describes three aspects of sampling— the **frame,** the size and the **technique/method** that would be employed for sampling based on random or non-random selection.

Sampling Techniques/methods:

Sampling techniques may be based either on probability or non-probability of every individual being selected

I. Non-probability sampling– does not give all the individuals in the population equal chances of being selected. Some such techniques are as follows:

Convenience Sampling– Selecting samples that are accessible to the researcher or easy to collect.

Consecutive sampling– Selecting all accessible subjects making the sample a better representation of the entire population.

Judgmental Sampling or purposive sampling–selecting with the belief that some subjects are more suitable than other individuals for the purpose.

Snowball Sampling– selecting a subject who is asked to identify another potential subject meeting the research criteria (Snowball sample is hardly representative of the population).

Quota Sampling– Selecting sample that ensures equal or proportionate representation of subjects per trait considered as basis of the quota for a given sample size.

Dimensional Sampling (an extension of quota sampling)– The researcher takes into account several characteristics (e.g. gender, income, residence and education) and ensures that there is at least one person in the study representing each of the chosen characteristics.

II. Probability/sampling– on the other hand, utilizes some form of random selection method that ensures that the different units in the population have equal probabilities of being chosen. These are:

Simple Random Sampling– Drawing a name out of a lot, or using computers for generating random numbers.

Stratified Random Sampling– Randomly selecting from smaller group divisions of a large population that usually don't overlap but represent the entire population together.

Cluster random sampling– Randomly selecting participants from selects areas (i.e. cities or counties) when they are geographically spread out.

Systematic Sampling– Randomly selecting every "nth" individual to be a part of the sample according to a random starting point and a fixed periodic interval.

WRITING RESEARCH PROPOSAL

Once the research design and sampling design are finalised, it is time for the researcher to write and submit the research proposal. It is a document that informs the concerned people about the specifics of the proposed study. It may be written for the purpose of obtaining an academic degree (MA Dissertation OR PhD thesis); to solicit funding for the research project; or to carry out market research for corporate houses.

A research proposal encapsulates

- Need for the study/ Gap in existing knowledge it will address
- Time and scope of the study
- List of Benefits and beneficiaries of the study
- Type(s) of data, methods of data collection and data analysis
- Help/facilities and funds sought
- Profile and credentials of the proposers of the research study
- Assurance of addressing ethical issues

STEP 6: DEVELOPING DATA COLLECTION INSTRUMENT & COLLECTING DATA

Purpose of Data in a research study:

Data collection forms a major part of the research process. Data is collected in any research study for the following purposes:

1. To represent verifiable/testable facts about the variables in the hypothesis/predicted result
2. To be analysed to determine consistency with the predicted outcome
3. To enable support of Null hypothesis if consistency with predicted outcome is established
4. To enable rejection of hypothesis if not consistent with the predicted result

Bias in clinical research

Type of Bias	How to Avoid it
I. Bias before study	
(i) Preferential study design	Select validated methods; define risk and outcome objectively; standardize data collection
(ii) Sample Selection bias	Select samples from the same general population to avoid confounding results
(iii) Channeling bias	Use rigorous criteria to assign cohorts
II. Bias during study	
(i) Interviewer bias	Standardize interviewer's interaction with the respondent
(ii) Chronology bias	Use prospective studies; avoid using historic controls

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(iii) Recall bias	Use objective data sources; conduct prospective studies
(iv) Transfer bias	Make contingency plan in study design (prior to the study) for lost/transferred patients
(v) Exposure Misclassification	Define exposure in study design itself; avoid using proxies of exposure
(vi) Outcome Misclassification	Use objective/ validated diagnostic methods or measures as primary outcome
(vii) Performance bias	Minimize variability in clinical method with cluster stratification
(viii) Confounding	Control unknown confounders with randomization; and known confounders with case control design/ randomization (during preparation of study design) or regression (during data analysis)
III. Bias after study	
Citation bias	Register the study with an accepted clinical trials registry and ensure no similar study exists or is underway

An **index** is a way of obtaining one summarized score/response from a variety of questions/ statements representing a belief, feeling, or attitude.

A **scale** is used to categorize and/or quantify variables. Measurement scales measure quantitative/numerical data for statistical analysis; or, qualitative data like level of intensity of the variable (attitude, etc.) in terms of the respondent's agreement or disagreement with the topical statement.

1. Statistical Measurement Scales

Statistical data can be measured on any of the following four scales: nominal, ordinal, interval or ratio.

i. **Nominal scale** is the system of naming or labelling events by assigning number symbols. Random numbers are assigned to members of a playing team to name/identify them on a nominal scale. Such numbers have no quantitative value and cannot be added, subtracted, multiplied, or divided. Nor can they be compared or used for calculating average, mean, mode, etc. The only possible arithmetic operation with a nominal scale is counting of members in a group. Nominal data are, thus, counted data.

ii. **Ordinal scale** places events/objects in an order and is used in research relating to qualitative phenomena. e.g., the rank of a student in a particular grade is determined using an ordinal scale. Ordinal scales only rank items from one extreme to another and ordinal measures have no absolute values. Therefore, the actual differences between the pairs of adjacent ranks may not be equal.

iii. **Interval scale** has intervals earmarked in terms of some criterion that has been established as a basis for making the units equal/comparable. In reality, the units are equal only on the basis of assumptions on which the rule is based. Interval scales can have an arbitrary zero, but not an absolute zero.

iv. **Ratio scale** does have an absolute zero of measurement, though it may not be too precise. Absolute zero of length as well as time is conceivable. e.g., the zero mark on a metre scale indicates the complete absence of length/breadth/height. The number of 'absent' marks in a monthly attendance sheet, the number of typographical errors in a manuscript, etc., can be represented on ratio scales. Each of these measurements has an absolute zero; and all typo errors and all 'absent' marks can be assumed to be equal in significance.

2. Self Rating Scales

Self-rating scales include survey questions that offer multiple answer options ranging between the two extreme attitudes, e.g., from 'completely agree' to 'not agree at all'; OR from 'extremely likely' to 'not at all likely.' They typically include a moderate median or a neutral midpoint. Researchers choose different rating scales depending on the nature and requirement of their research study. Following are the self-rating scales researchers use.

A. Graphic Rating Scale
B. Itemized Rating Scales (6 types)
a. Likert Scale
b. Semantic Differential/ Thurston Scales
c. Stapel's Scale
d. Multi Dimensional Scaling
e. Guttman Scales/Scalogram scale
f. The Q Sort technique

Qualitative Data	Quantiative Data
Associated with details/description	Associated with numbers
Can only be observed and not accurately measured	Can be accurately measured and statistically analyzed
Usable as segregated, well-defined groups or categories	Usable in numerical form
Ex. appearance, colour, flavour, etc.	Ex. temperature, time, height, weight, etc.

Methods of Collecting Quantitative Data

Quantitative data has value in the form of numbers. Each dataset is quantifiable information having a unique numerical value associated to it. This quantity/number is verifiable and can be used for mathematical/ statistical calculations and analysis, based on which, research questions can be answered and real-life decisions can be made.

Measuring of various parameters is convenient and controllable with quantitative data as mathematical derivation can easily be done. Quantitative data is usually collected for statistical analysis using experiments, surveys, polls or questionnaires administered to a selected sample section of a population. The results must be applicable/ generalisable to the entire population.

Types of Quantitative Data

i. Number count equated with entities
ii. Physical measurement of objects/entities.

iii. Conversion of sensory measurements (e.g., electromagnetic information) of parameters into numerical data.
iv. Future projection of data using algorithms and other mathematical analysis tools.
v. Quantification of qualitative entities on numerical scales

Advantages of Quantitative Data

i. Allows in-depth research since quantitative data can be statistically analyzed.
ii. Numerical nature of quantitative data minimises personal bias.
iii. Results are extremely accurate as data obtained are objective in nature.

Disadvantages of Quantitative Data

i. Making conclusions is difficult as quantitative data is not descriptive and yields restricted information.
ii. As it relies on the types of questions selected, it is prone to researcher's bias in results. So, the researcher must frame questions in strict accordance with the objective(s) of research.

Methods of Collecting Qualitative Data

Qualitative data doesn't include numbers in its definition of traits of an object or group of objects unlike quantitative data. Data collection for qualitative research usually involves direct interaction with individual respondents/ subjects on a one to one basis or individuals in a group setting. The main methods for collecting qualitative data are surveys (in the form of observation, questionnaire, schedules, focus group and interview), ethnography, case studies, narrative, phenomenology and grounded theory.

Types of Qualitative Data

Qualitative data is information about abstract qualities, such as beauty, colour, complexion, softness, gender, etc., that cannot really be measured. However, such data can be placed in categories according to codes of common properties, etc. Therefore, qualitative data is also called categorical data. e. g. a student's performance feedback on fluency, intonation, throw of words, clarity in pronunciation without giving a grade to the child, this is considered as an example of qualitative data.

Advantages of Qualitative Data

i. The information collected is richer having the respondent's/ subject's attitudes, feelings, behaviours and deep insight into the phenomenon under study.
ii. Encourages respondents/ subjects to elaborate their responses; and open up new topic areas not initially considered by the researcher.

Disadvantages of Qualitative Data

i. Qualitative data collection methods are time consuming and expensive; therefore, data is usually collected from a smaller sample.
ii. As sample sizes are smaller, they may not be a correct represent the population.

STEP 7: DATA ANALYSIS

A **parameter** is any computed number describing an entire population, such as average, percentage or proportion. Parameter inference refers to computing the statistic as an estimate of the parameter. The population mean μ and the population proportion p are two different population parameters.

A **statistic** is a number computed from the data observed in a random sample of a population without requiring the use of any unknown parameters, such as a sample mean. Statistical inference refers to deriving information from the sample of the population.

Statistic Vs Parameter: Statistic describes a sample. Parameter describes an entire population.

Validity is the extent to which a concept, test, measurement or conclusion, accurately provides/yields what it is primarily supposed to; or, corresponds accurately to the real world.

Reliability is the degree to which the result of a measurement, calculation, or specification obtained by administering the same test twice over a period of time to a group of individuals can be depended on to produce stable and consistent results.

Methods of analyzing quantitative data (collected in surveys):

1. Cross-tabulation: This is one of the most preferred and widely used quantitative data analysis methods. It uses a basic tabular form to draw inferences by a comparison of different data-sets obtained in the research study. The data can be mutually exclusive or may have some correlation with each other.

2. Trend analysis: This is a statistical analysis method of looking at quantitative data that has been collected over a long period of time. This data analysis method comprises collecting feedback about data changes over time and aims to study the change effected in variables while one variable remains unchanged.

3. MaxDiff analysis: This is a quantitative data analysis method used to gauge customer preferences for a particular product purchase and to determine, in the process, what parameters rank higher than the others. This method is very similar to conjoint analysis, given below, but is much easier to implement. However, the two can be interchangeably used.

4. Conjoint analysis: This is a similar quantitative data analysis method that analyzes what parameters work to clinch a purchasing decision. This method enables collection and analysis of advanced metrics which determine parameters are the most important; and provide an in-depth understanding into purchasing decisions.

5. TURF analysis (Total Unduplicated Reach and Frequency Analysis): This is a quantitative data analysis methodology that examines the market reach of a product or service or a combination of the two. This method is used by organizations to understand the avenues through which their communication/ messages reach customers and prospective customers; and with what frequency. This helps researchers modify/update their market strategies.

6. Gap analysis: This is a quantitative data analysis method wherein side-by-side matrix is used to depict quantitative data so that the difference between expected performance and actual performance can be measured. So, this data analysis helps measure gaps in performance and expectation to bridge this gap.

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7. SWOT analysis: This is a quantitative data analysis method of assigning numerical values to indicate strength, weaknesses, opportunities and threats of an organization/ product /service which help in understanding the whole scenario of the market competition so that effective business strategies could be devised.

8. Text analysis: This is an advanced statistical method where intelligent tools quantify qualitative and open-ended data into easily understandable data. So, this method is used to convert the raw and unstructured survey data into a numerical structure that makes sense.

Methods of analyzing Qualitative data

1. **Content analysis:** This is the process of categorizing verbal or behavioural data to classify, summarize and tabulate the data.
2. **Narrative analysis:** This is the process of reformulating respondents' narration taking into account the context and experiences of each respondent. It is, indeed, the revision/ interpretation of primary qualitative data by researcher.
3. **Discourse analysis:** This is the method of analysing all natural discourse in spoken form and all written text.
4. **Grounded theory:** This method of qualitative data analysis is initiated with an analysis of a single case to formulate a theory. Then, more cases are analysed to examine whether they contribute to the theory.
5. **Framework analysis:** This is an advanced method of analysis consisting of several stages such as familiarization, identifying a thematic framework, coding, charting, mapping and interpretation.

Techniques/Tools of Statistical Data Analysis

1. Correlation

Correlation is a statistical technique to obtain a summary of the relationship between pairs of variables which explains whether they are related; if they are, then how strongly. Take the example of height and weight. One assumption is that taller people are heavier than shorter people; but, the relationship isn't always true. People of the same height may differ in body weight, and it is often observed that shorter one of a given pair is heavier than the taller one. However, the average weight of people 150 cm tall is less than the average weight of people160 cm tall whose average weight is less than that of people 170 cm tall. Correlation analysis can show how much of the variation in peoples' weights is related to their heights. An intelligent correlation analysis reveals the unsuspected correlations contained in the data and also identify the strongest correlation among the suspected ones.

A correlation coefficient is a numerical measure of some type of statistical relationship existing between two variables. It is the main result of the process of correlation. It is denoted by r and ranges from -1 to +1. The closer r is to +1 or -1, the more closely the two variables are related, where +1 indicates the strongest possible agreement and −1 the strongest possible disagreement.

2. Frequency Distribution

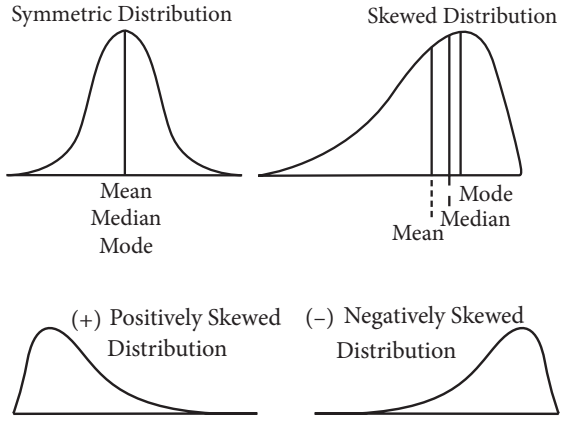
Frequency distribution is the technique of organizing and summarizing the data collected from a survey in a tabular format. It consists in listing the qualitative or quantitative values of a variable in a data set and marking the frequency of occurrence of each value (number of times each value occurs). Frequency distribution is the basis of all statistical analysis and also forms the first step in analysis of survey data. The tabular representation makes it convenient to interpret the data and detect outliers or extreme values in the survey data set. Frequency distribution can be graphically represented as a curve.

A ***normal distribution*** is a bell-shaped frequency distribution curve. Most of the data values in a normal distribution cluster around the mean. The further a data point is from the mean, the less likely it is to occur. The center of a normal distribution is located at its peak.+ Normal distributions are symmetric (the right side of the central line is a mirror image of the left side), unimodal (, and asymptotic (they approach but never touch the x-axis).; and the mean, median, and mode are all equal.

Standard deviation is a statistic that projects how closely clustered around their mean are the values in a data set as shown in the distribution curve. It is shown by means of a bell-shaped curve. When the values are bunched together, the bell curve is steep which means the standard deviation is small. When the values are spread apart, the bell curve is relatively flat, which indicates that the standard deviation is relatively large.

The ***standard normal distribution*** is that particular case of normal distribution when a normal random variable has a mean of zero and a standard deviation of one. The normal random variable of a standard normal distribution is called a standard score or a z score.

Skewness is asymmetry in a statistical distribution, in which the bell curve appears distorted or skewed either to the left or to the right. Skewness can be quantified to define the extent to which a distribution differs from a normal distribution.

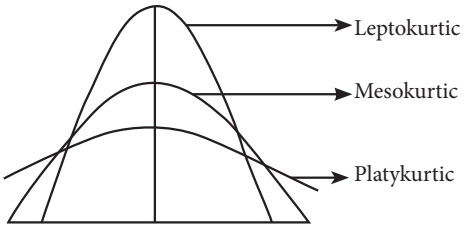


Kurtosis is the sharpness of the peak of a frequency-distribution curve, i.e., a measure of whether the data are heavy-tailed or light-tailed relative to a normal distribution.

Leptokurtic distributions are statistical distributions where there are extreme points along the X axis, resulting in a higher kurtosis than found in a normal distribution.

Mesokurtic distributions have a kurtosis of zero, matching that of the normal distribution, or normal curve, also known as a bell curve.

Platykurtic distributions have the peak of the curve comparatively flatter than that of normal distribution.



Kurtosis

4. Chi-square test

The chi-square test is a statistical procedure employed for examining the differences between variables of different categories in the same population. The chi-square distribution is the distribution of the sum of squared standard normal deviates. Chi Square distributions are positively skewed or skewed to the right, with the degree of skew decreasing with increasing degrees of freedom. As the degrees of freedom increase, the Chi Square distribution approaches a normal distribution.

5. f-test

An f-test is a statistical test to compare different statistical models fitting a data set sampled from a population in order to identify the one that fits best. It is performed on the basis of the F statistic. The F- statistic has an F-distribution under the null hypothesis. F-distribution is a skewed distribution of probabilities similar to a chi-squared distribution. But while the chi-squared distribution deals with the degree of freedom with one set of variables, the F-distribution deals with multiple levels of events having different degrees of freedom.

F-distribution is defined as the ratio between the two independent chi square variables that are divided by their respective degree of freedom.

6. t-test

A t-test is a parametric test which finds out if two sets of data are significantly different, how significant those differences are; and, if those differences (measured in means/averages) could have happened by chance.

A t-distribution is a probability distribution in which the bell shape of a normal distribution has a heavier tail, because T-distributions have a greater chance for extreme values than normal distributions. The t-value is a ratio of the difference between the mean of the two sample sets (numerator value) and the difference that exists within the sample sets (the denominator).

7. z-test

A z-test is a statistical test that is performed to determine the probability of the new data being near the point for which a score was calculated. It is a statistical calculation to compare a sample mean with the defined population mean and is typically used in case of large samples ($n > 30$).

8. Regression analysis

Regression analysis is a predictive technique of identifying the variable(s) that have impact on a variable of interest and investigating the relationship between the target dependent variable and the predictor independent variable(s).

Simple Regression involves single independent variable while Multiple Regression involves multiple independent variables.

9. Analysis of variance (ANOVA)

The main purpose of an ANOVA test is to check if two or more groups show variance, i.e., they differ from each other significantly in one or more characteristics in a regression study. Variance is the expected squared deviation of a random variable from its mean.

10. Discriminant Analysis

Discriminant Analysis aims to obtain a set of prediction equations based on independent variables so as to use it to classify individuals. It works with a dual objective— to obtain predictive equations for grouping new individuals; and, to interpret those equations to better understand the correlation between the variables. It can be used to determine which predictor variables are related to the dependent variable and to predict the value of the dependent variable given certain values of the predictor variables.

Discriminant analysis is very similar to multiple regression analysis in methodology, from variable selection to a residual analysis for determining the accuracy of the discriminant equations.; however, discriminant analysis must have a discrete dependent variable while regression analysis deals with a continuous dependent variable. Discriminant analysis is also related very closely to the one-way MANOVA. Only, the variables stand reversed . The factor or classification variable in the MANOVA becomes the dependent variable in discriminant analysis and vice versa.

11. Structural equation modelling

It is a multivariate statistical analysis technique that is used to analyze structural relationships. This technique is the combination of factor analysis and multiple regression analysis, and it is used to analyze the structural relationship between measured variables and latent constructs.

12. Factor analysis

It is a statistical method used to describe variability among observed, correlated variables in terms of a potentially lower number of unobserved variables called factors. In an experiment, the factor (also called an independent variable) is an explanatory variable manipulated by the experimenter. Each factor has two or more levels (i.e., different values of the factor).

13. Cluster analysis

Cluster analysis (or classification analysis or numerical taxonomy) is a multivariate method of classifying a sample of subjects/ objects/cases into a number of different clusters on the basis of a set of measured variables, such that similar subjects are placed in the same group.

STEP 8: HYPOTHESIS TESTING

Hypothesis testing in statistical analysis starts with the construction of two statements— the null hypothesis and the alternative hypothesis – and involves testing of the latter by proving the former false; or, making the decision whether the null hypothesis should be accepted or rejected. The null hypothesis is only rejected if its probability falls below a predetermined significance level, in which case the hypothesis being tested is said to have that level of significance.

Null Hypothesis (HO or H0):

It is what a researcher attempts to find evidence against in the

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hypothesis test. The null hypothesis is generally a hypothesis of 'no difference'.

Alternative hypothesis

It is the obverse of the null hypothesis. It reflects that there will be an observed effect for the experiment and the observations are the result of a real effect.

P-value:

It is the level of marginal significance within a statistical hypothesis test representing the probability of the occurrence of a given event. If the p-value is greater than alpha, the null hypothesis cannot be rejected.

Level of Significance (Alpha):

It refers to the level of significance in which the null-hypothesis is accepted or rejected. Normally, a significance level of 5% is taken for accepting or rejecting a hypothesis, since 100% accuracy is not possible.

Random error or Chance error or chance variation is the inherent error in any predictive statistical model. It is defined as the difference between the predicted value of a variable (by the statistical model in question) and the actual value of the variable.

Type I error: It occurs when the null hypothesis is rejected, although the hypothesis was true.

Type II error: It occurs when the null hypothesis is accepted, although the hypothesis was false.

STEP 9: GENERALISATIONS AND INTERPRETATIONS OF CONCLUSIONS

Generalization involves informed reasoning to draw broad inferences from particular observations. It is standard in quantitative research, but is controversial in qualitative research. Most qualitative studies aim not to generalize, but to provide a rich, contextualized understanding of some aspect of human experience through the intensive study of particular cases. Yet, both qualitative and quantitative researchers emphasize on generalization in relation to knowledge claims in environments where evidence for improving practice is held in high esteem. Issues relating to generalization are, however, often ignored or misrepresented by both groups of researchers.

STEP 10: REPORT PREPARATION OR THESIS/ ARTICLE/ PAPER WRITING

The report of a research study carried out for finding answers to research question(s) is prepared in different ways in accordance with the purpose, the target audience/reader and the presentation arena. While a Paper is meant to be presented before the participants in a Workshop, Seminar, Symposium or Conference, and, an Article is published in a peer-reviewed academic journal; a Thesis or Dissertation is published in pursuit of an academic degree. A position paper is an essay that presents an arguable opinion about an issue – typically that of the author or some specified entity. Position papers are published in academia, in politics, in law and other domains.

EXERCISE

1. Which of the following are the general steps of a scientific research? **[June-2005]**
(a) Observation, verification, hypothesizing, theorizing
(b) Experiment, observations, verification, hypothesizing
(c) Observation, hypothesizing, experiments, theorizing
(d) theorizing, Observation, experiments, hypothesizing

2. A researcher who adopts statistical methodology or drawing a conclusion should be properly interested in knowing which of the following facts? **[June-2005]**
(a) Whether data can be obtained as population
(b) Whether adequate methodologies are available or not
(c) Weather the analysis of data is possible or not
(d) Whether suitable conclusion can be drawn

3. For conducting a study relating to the family size and per capita income in our country, a researcher divides the whole population of the region into different income groups and then takes random samples from each of the groups. The technique used by him for the sample collection is called: **[June-2005]**
(a) random sampling
(b) levelled random sampling
(c) group sampling
(d) patterned sampling

4. Books and records are the primary sources of data in : **[December-2005]**
(a) historical research (b) participatory research
(c) clinical research (d) laboratory research

5. A satisfactory statistical quantitative method should not possess one of the following qualities : **[December-2005]**
(a) Appropriateness (b) Measurability
(c) Comparability (d) Flexibility

6. Normally, a thorough research consists of four stages which have been appended below: **[June-2005]**
1. Preparing scheme of observation
2. Interpreting the Conclusion drawn
3. Determining the Objective
4. Analysing the observations obtained for the above stages

State which of the following order is correct in terms of sequence of the stages?
(a) 3, 1, 4 and 2 (b) 1, 4, 3 and 2
(c) 1, 2, 3 and 4 (d) 3, 4, 1 and 2

7. The first step of research is: **[December-2006]**
(a) Selecting a problem (b) Searching a problem
(c) Finding a problem (d) Identifying a problem

8. A ratio represents the relation between: **[June-2007]**
(a) Part and Part (b) Part and Whole
(c) Whole and Whole (d) All of the above

9. A research problem is feasible only when: **[June-2007]**
(a) it has utility and relevance
(b) it is researchable
(c) it is new and adds something to knowledge
(d) all the above

10. To test null hypothesis, a researcher uses: **[June-2007]**
(a) t test (b) ANOVA
(c) X^2 (d) factorial analysis

11. The question to be answered by factorial analysis of the quantitative data does not explain one of the following: **[June-2007]**
(a) Is 'X' related to 'Y'?
(b) How is 'X' related to 'Y'?
(c) How does 'X' affect the dependent variable 'Y' at different levels of another independent variable 'K' or 'M'?
(d) How is 'X' by 'K' related to 'M'?

12. Which technique is generally followed when the population is finite? **[December-2007]**
(a) Area Sampling Technique
(b) Purposive Sampling Technique
(c) Systematic Sampling Technique
(d) None of the above

13. The importance of the correlation co-efficient lies in the fact that: **[June-2008]**
(a) There is a linear relationship between the correlated variables.
(b) It is one of the most valid measure of statistics.
(c) It allows one to determine the degree or strength of the association between two variables.
(d) It is a non-parametric method of statistical analysis.

14. Which one of the following principles is not applicable to sampling? **[June-2008]**
(a) Sample units must be clearly defined
(b) Sample units must be dependent on each other
(c) Same units of sample should be used throughout the study
(d) Sample units must be chosen in a systematic and objective manner

15. Formulation of hypothesis may NOT be required in: **[June-2008]**
(a) Survey method (b) Historical studies
(c) Experimental studies (d) Normative studies

16. Research problem is selected from the stand point of: **[June-2008]**
(a) Researcher's interest
(b) Financial support
(c) Social relevance
(d) Availability of relevant literature

17. Which of the following sampling method is appropriate to study the prevalence of AIDS amongst male and female in India in 1976, 1986, 1996 and 2006? **[June-2008]**
(a) Cluster sampling
(b) Systematic sampling
(c) Quota sampling
(d) Stratified random sampling

18. Which one is called non-probability sampling? **[June-2008]**
(a) Cluster sampling
(b) Quota sampling
(c) Systematic sampling
(d) Stratified random sampling

19. A research problem is not feasible only when:
(a) it is researchable **[December-2008]**
(b) it is new and adds something to knowledge
(c) it consists of independent and dependent variables
(d) it has utility and relevance

20. When a research problem is related to heterogeneous population, the most suitable sampling method is: **[December-2008]**
(a) Cluster Sampling (b) Stratified Sampling
(c) Convenient Sampling (d) Lottery Method

21. We use Factorial Analysis: **[June-2009]**
(a) To know the relationship between two variables
(b) To test the Hypothesis
(c) To know the difference between two variables
(d) To know the difference among the many variables

22. A Null hypothesis is **[December-2009]**
(a) when there is no difference between the variables
(b) subjective in nature
(c) the same as research hypothesis
(d) when there is difference between the variables

23. Which of the following is the first step in starting the research process? **[June-2010]**
(a) Searching sources of information to locate problem.
(b) Survey of related literature
(c) Identification of problem
(d) Searching for solutions to the problem

24. A common test in research demands much priority on **[June-2010]**
(a) Reliability (b) Useability
(c) Objectivity (d) All of the above

25. The 'Sociogram' technique is used to study **[December-2010]**
(a) Vocational Interest (b) Professional Competence
(c) Human Relations (d) Achievement Motivation

26. Normal Probability Curve should be **[June-2010]**
(a) Positively skewed (b) Negatively skewed
(c) Leptokurtic skewed (d) Zero skewed

27. Which of the following is not an example of a continuous variable ? **[December-2010]**
(a) Family size (b) Intelligence
(c) Height (d) Attitude

28. **Assertion (A) :** The coin when flipped next time will come up tails.
Reason (R) : Because the coin was flipped five times in a row, and each time it came up heads. **[December-2011]**
Choose the correct answer from below :
(a) Both (A) and (R) are true, and (R) is the correct explanation of (a).
(b) Both (A) and (R) are false, and (R) is the correct explanation of (A).

(c) (a) is doubtful, (R) is true, and (R) is not the correct explanation of (A).
(d) (a) is doubtful, (R) is false, and (R) is not the correct explanation of (A).

29. A hypothesis is a **[December-2011]**
(a) law (b) canon
(c) postulate (d) supposition

30. Which of the following sampling methods is based on probability ? **[December-2012]**
(a) Convenience sampling (b) Quota sampling
(c) Judgement sampling (d) Stratified sampling

31. Identify the incorrect statement : **[December-2012]**
(a) A hypothesis is made on the basis of limited evidence as a starting point for further investigations.
(b) A hypothesis is a basis for reasoning without any assumption of its truth.
(c) Hypothesis is a proposed explanation for a phenomenon.
(d) Scientific hypothesis is a scientific theory.

32. Arrange the following steps of research in correct sequence: **[December-2012]**
1. Identification of research problem
2. Listing of research objectives
3. Collection of data
4. Methodology
5. Data analysis
6. Results and discussion

(a) 1 – 2 – 3 – 4 – 5 – 6 (b) 1 – 2 – 4 – 3 – 5 – 6
(c) 2 – 1 – 3 – 4 – 5 – 6 (d) 2 – 1 – 4 – 3 – 5 – 6

33. A working hypothesis is **[June-2013]**
(a) a proven hypothesis for an argument.
(b) not required to be tested.
(c) a provisionally accepted hypothesis for further research.
(d) a scientific theory.

34. With which one of the following techniques communality is associated ? **[September-2013]**
(a) Univariate analysis (b) Factor analysis
(c) Case studies (d) SWOT analysis

35. Identify the correct sequence of research steps : **[September-2013]**
(a) Selection of topic, review of literature, data collection, interpretation of findings.
(b) Review of literature, selection of topic, data collection, interpretation of findings.
(c) Selection of topic, data collection, review of literature, interpretation of findings.
(d) Selection of topic, review of literature, interpretation of findings, data collection.

36. Sampling error decreases with the **[December-2013]**
(a) decrease in sample size
(b) increase in sample size
(c) process of randomization
(d) process of analysis

37. The sequential operations in scientific research are **[December-2013]**
(a) Co-variation, Elimination of Spurious Relations, Generalisation, Theorisation
(b) Generalisation, Co-variation, Theorisation, Elimination of Spurious Relations
(c) Theorisation, Generalisation, Elimination of Spurious Relations, Co-variation
(d) Elimination of Spurious Relations, Theorisation, Generalisation, Co-variation.

38. Which one of the following is not a non-parametric test ? **[September-2013]**
(a) t-test (b) Sign test
(c) Chi-square test (d) Run test

39. Which of the following sampling methods is not based on probability ? **[June-2013]**
(a) Simple Random Sampling
(b) Stratified Sampling
(c) Quota Sampling
(d) Cluster Sampling

40. Which one of the following is a nonprobability sampling method ? **[September-2013]**
(a) Simple Random Sampling
(b) Stratified Sampling
(c) Cluster Sampling
(d) Quota Sampling

41. The variable which impacts the relationship between an independent variable and a dependent variable is known as **[September-2013]**
(a) antecedent variable (b) precedent variable
(c) predictor variable (d) control variable

42. The population information is called parameter while the corresponding sample information is known as **[December-2013]**
(a) Universe (b) Inference
(c) Sampling design (d) Statistics

43. In sampling, the lottery method is used for **[December-2013]**
(a) Interpretation (b) Theorisation
(c) Conceptualisation (d) Randomisation

44. Which one of the following is a nonprobability sampling? **[June-2014]**
(a) Simple random (b) Purposive
(c) Systematic (d) Stratified

45. "Sampling Cases" means **[December-2014]**
(a) Sampling using a sampling frame
(b) Identifying people who are suitable for research
(c) Literally the researcher's brief case
(d) Sampling of people, newspapers, television programmes etc.

46. The frequency distribution of a research data which is symmetrical in shape similar to a normal distribution but center peak is much higher, is **[December-2014]**
(a) Skewed (b) Mesokurtic
(c) Leptokurtic (d) Platykurtic

47. "Male and female students perform equally well in a numerical aptitude test." This statement indicates a : **[June-2015]**
(a) research hypothesis (b) null hypothesis
(c) directional hypothesis (d) statistical hypothesis

48. Which of the following statements is true in the context of the testing of a hypothesis ? **[December-2015]**
(a) It is only the alternative hypothesis, that can be tested.
(b) It is only the null hypothesis, that can be tested.
(c) Both, the alternative and the null hypotheses can be tested.
(d) Both, the alternative and the null hypotheses cannot be tested.

49. Which of the following is an initial mandatory requirement for pursuing research? **[July-2016]**
(a) Developing a research design
(b) Formulating a research question
(c) Deciding about the data analysis procedure
(d) Formulating a research hypothesis

50. In a research on the effect of child-rearing practices on stress-proneness of children in completing school projects, the hypothesis formulated is that 'child rearing practices do influence stress-proneness'. At the data-analysis stage a null hypothesis is advanced to find out the tenability of research hypothesis. On the basis of the evidence available, the null hypothesis is rejected at 0.01 level of significance. What decision may be warranted in respect of the research hypothesis? **[July-2016]**
(a) The research hypothesis will also be rejected.
(b) The research hypothesis will be accepted.
(c) Both the research hypothesis and the null hypothesis will be rejected.
(d) No decision can be taken in respect of the research hypothesis.

51. Which sequence of research steps is logical in the list given below ? **[January-2017]**
(a) Problem formulation, Analysis, Development of Research design, Hypothesis making, Collection of data, Arriving at generalizations and conclusions.
(b) Development of Research design, Hypothesis making, Problem formulation, Data analysis, Arriving at conclusions and data collection.
(c) Problem formulation, Hypothesis making, Development of a Research design, Collection of data, Data analysis and formulation of generalizations and conclusions.
(d) Problem formulation, Deciding about the sample and data collection tools, Formulation of hypothesis, Collection and interpretation of research evidence.

52. Which of the following sequences of research steps is nearer to scientific method ? **[July-2018]**
(a) Suggested solution of the problem, Deducing the consequences of the solution, Perceiving the problem situation, Location of the difficulty and testing the solutions.
(b) Perceiving the problem situation, Locating the actual problem and its definition, Hypothesizing, Deducing the consequences of the suggested solution and Testing the hypothesis in action.
(c) Defining a problem, Identifying the causes of the problem, Defining a population, Drawing a sample, Collecting data and Analysing results.
(d) Identifying the causal factors, Defining the problem, Developing a hypothesis, Selecting a sample, Collecting data and arriving at generalizations and Conclusions.

53. Which among the following provides the strongest evidence of cause-and-effect relationship between independent and dependent variables? **[December-2018]**
(a) Experimental approach
(b) Correlational approach
(c) Non-experimental approach
(d) Descriptive statistics

54. With what name an attribute like height, weight or happiness that is measurable and that is assigned with changing values be called? **[December-2018]**
(a) Variable (b) Statistics
(c) Sample (d) Heuristic

55. Which of the following statements is correct? **[December-2018]**
(a) Reliability ensures validity
(b) Validity ensures reliability
(c) Reliability and validity are independent of each other
(d) Reliability does not depend on objectivity

56. A statistical measure based upon the entire population is called parameter while measure based upon a sample is known as: **[December-2018]**
(a) Sample parameter (b) Inference
(c) Statistics (d) None of these

57. The F-test: **[December-2018]**
(a) is essentially a two tailed test.
(b) is essentially a one tailed test.
(c) can be one tailed as well as two tailed depending on the hypothesis.
(d) can never be a one tailed test.

58. A researcher fails to reject the null hypothesis (Ho) in his/her research. What implications will it carry for his/her principal research hypothesis? **[20th June 2019-Ist Shift]**
(a) Accepting the research hypothesis.
(b) Rejecting the research hypothesis.
(c) Not taking any decision on the research hypothesis.
(d) Improving the research hypothesis.

59. What are the elements of evaluation plan? **[20th June 2019-IInd Shift]**
(1) Purpose (3) Resources
(2) Analysis (4) Authority
Select the correct answer from the options given below:
(a) (1) and (3) (b) (2) only
(c) (2), (3) and (4) (d) (1), (2) and (3)

60. A hypothesis is: **[20th June 2019-IInd Shift]**
(a) A certain and established finding.
(b) A part of the research question.
(c) A strategy of evaluating data.
(d) A tentative statement providing an explanation.

61. Tertiary source of data is: **[20th June 2019-IInd Shift]**
(a) Films, hoardings and posters.
(b) Government gazette, newspapers and magazines.
(c) Information derived from both primary and secondary sources.
(d) Data collected from policy papers.

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62. Critical language testing in a research report is: **[21st June 2019-Ist Shift]**
(a) Testing language from an ethical point of view, revealing its misuses.
(b) Evaluating the stylistic characteristics of language.
(c) Critiquing the ideology of the author.
(d) Observing the gender role played by language.

63. A university teacher plans to study the effect of level of aspiration of students in terms of their socio-economic background on their scholastic performance at the term end evaluation conducted by an external testing agency. What is the dependent variable in this study? **[21st June 2019-Ist Shift]**
(a) Level of aspiration of students
(b) Socio-economic background of students
(c) Scholastic performance of students
(d) Term end evaluation

64. After identifying the different variables and establishing the logical reasoning in theoretical framework, the next step in the research process is to **[21st June 2019-IInd Shift]**
(a) Conduct survey
(b) Generate hypothesis
(c) Focus on group discussion
(d) Use experiment in an investigation

65. The research design is specifically related to which of the following features in research? **[24th June 2019-Ist Shift]**
(i) Sample selection
(ii) Formulation of a plan
(iii) Deciding about the tool for data collection
(iv) Hypothesis making
(v) Choice of a field of inquiry
Select your answer from the options given below.
(a) (ii), (iii) and (iv) (b) (i), (ii) and (iii)
(c) (ii), (iv) and (v) (d) (iii), (iv) and (v)

66. During research, while recording observation if an observer rates an individual based on the rating given in another aspect of the interaction, this is termed as the: **[24th June 2019-IInd Shift]**
(a) Evaluation effect
(b) Error of central tendency
(c) Halo effect
(d) Categorical effect

67. The formulation of a research problem can be compared to: **[24th June 2019-IInd Shift]**
(a) Laying the foundation of a building.
(b) Building the walls of a home.
(c) Polishing the doors of a building.
(d) Constructing the ceiling of a house.

68. In experimental research based studies the observations derived from which of the following variables are considered for statistical analysis? **[25th June 2019-IInd Shift]**
(a) Independent variable (b) Dependent variable
(c) Moderator variable (d) Control variable

69. A shift in attitude in respondents between two points during data collection is called: **[26th June 2019-Ist Shift]**
(a) Reactive effect (b) Maturation effect
(c) Regression effect (d) Conditioning effect

70. Which of the following sequences correctly reflects scientific investigation? **[2nd Dec. 2019-Ist Shift]**
(a) Conceptualization, theorizing, deduced consequences, observation and testing
(b) Testing, observation, conceptualizing, theorizing and deduced consequences
(c) Theorizing, deducing consequences, testing, observing and conceptualizing
(d) Observation, conceptualization, theorizing, deduced consequences and method to verify them.

71. Hypothesis testing is the main concept of which type of research? **[3rd Dec. 2019-Ist Shift]**
(a) Experimental research
(b) Historical research
(c) Survey research
(d) Exegetic research

72. The probability sampling procedures are mostly used in which of the following researches? **[3rd Dec. 2019-IInd Shift]**
(A) Survey researches
(B) Experimental researches
(C) Phenomenology based researches
(D) Action researches
(E) Correlational design based researches
Select your answer from the follwoing options :
(a) (A), (B) and (E) (b) (A), (B) and (C)
(c) (B), (C) and (D) (d) (C), (D) and (E)

73. Which of the following sampling procedures will be appropriate for conducting researches with empirico-inductive research paradigm? **[4th Dec. 2019-Ist Shift]**
(a) Simple random sampling procedure
(b) Systematic sampling procedure
(c) Stratified sampling procedure
(d) Any of the non-probability sampling procedures

74. Which of the following statements fails to indicate the intent of purposive sampling? **[5th Dec. 2019-IInd Shift]**
(a) Purposive sampling is not the fundamental principle for selecting cases and individuals in qualitative research
(b) Purposive sampling places the investigators' research questions at the forefront of sampling considerations
(c) Theoretical saturation is a useful principle for making decision about sample size
(d) There is considerable disagreement about what is an acceptable minimum sample size in qualitative research

75. In case the population of research is heterogeneous in nature which of the following sampling techniques will ensure optimum representativeness of sample units? **[6th Dec. 2019-Ist Shift]**
(a) Simple random sampling
(b) Stratied random sampling
(c) Cluster sampling
(d) Systematic sampling

76. The fish bowl draw is a method of drawing a/an **[25th June 2019-IInd Shift]**
(a) independent sample (b) structured sample
(c) non-random sample (d) random sample

77. From the list given below identify those which are called 'Non-probability sampling procedures: **[26th June 2019-Ist Shift]**
(i) Simple random sampling
(ii) Dimensional sampling
(iii) Snowball sampling
(iv) Cluster sampling
(v) Quota sampling
(vi) Stratified sampling
Choose the correct option
(a) (i), (ii) and (iii) (b) (ii), (iv) and (v)
(c) (i), (iii) and (iv) (d) (ii), (iii) and (v)

78. The major characteristic of correlation analysis is to seek out: **[26th June 2019-Ist Shift]**
(a) Differences among variables
(b) Variations among variables
(c) Association among variables
(d) Regression among variables

79. Snowball sampling is the process of selecting a sample using **[26th June 2019-IInd Shift]**
(a) Networks (b) Groups
(c) Snowballs (d) Computer Programs

80. Research design that needs to collect factual information on a continuing basis is classified as **[26th June 2019-IInd Shift]**
(a) Longitudinal Study Design
(b) Pre and Post Study Design
(c) Cross-Sectional Study Design
(d) Double-Control Study Design

81. A tentative proposition with unknown validity that specifies a relationship between two or more variables is called **[26th June 2019-IInd Shift]**
(a) research problem (b) research proposal
(c) research design (d) research hypothesis

82. Identify the tests from the list given below, which are maximum performance tests in the context of research: **[2nd Dec. 2019-IInd Shift]**
(A) Personality tests
(B) Projective personality tests
(C) Achievement tests
(D) Attitude tests
(E) Intelligence tests
(F) Aptitude tests
Choose correct answer from the options given below:
(a) (A),(B) and (C) (b) (B), (C) and (E)
(c) (C),(E) and (F) (d) (A), (D) and (F)

83. Which of the following sequences represents the most logical sequence in doing research? **[3rd Dec. 2019-Ist Shift]**
(a) Identifying and defining a research problem, formulating a hypothesis, testing of hypothesis and reporting the results.
(b) Identify a research problem, defining the population and sample, collecting data and analysis of data.
(c) Survey of research defining the research problem, collecting data and presenting the outcomes.
(d) Defining research variables, hypothesizing, testing of research and reporting of research outcomes.

84. In which of the following steps of research, the scope for creativity and imagination is utmost? **[6th Dec. 2019-Ist Shift]**
(a) Identifying the research problem and dening it
(b) Figuring out the related studies and the techniques used by other researchers
(c) Identifying variables and hypothesizing
(d) Data analysis and presentation of results

85. Which of the following is an example of a maximum performance test? **[26th June 2019-Ist Shift]**
(a) Personality tests
(b) Projective personality tests
(c) Aptitude tests
(d) Interest and attitude scales

86. Match Set-I with Set-II **[6th Dec. 2019-IInd Shift]**

Set-I Research Tools		Set-II Measurement Scale	
A.	Questionnaire and interview	(i)	Ratio scale of measurement
B.	Intelligence and Aptitude Tests	(ii)	Ordinal Scale of measurement
C.	Attitude and Value Tests	(iii)	Interval Scale of measurement
D.	Speed and Frequency Tests	(iv)	Nominal Scale of measurement

Choose the correct answer from the options given below:
(a) A – (i); B – (ii); C – (iii); D – (iv)
(b) A – (iii); B – (i); C – (iv); D – (ii)
(c) A – (iv); B – (iii); C – (ii); D – (i)
(d) A – (ii); B – (iii); C – (i); D – (iv)

87. A good review of research literature aims at: **[20th June 2019-Ist Shift]**
(a) Subjective analysis of the content.
(b) Providing information about the authors and their affiliations.
(c) Generating research questions and validating those questions.
(d) Conducting multiple task-based screening.

88. Spotting gaps in the research literature is the chief way of identifying research questions. In this context, 'spotting gaps' in the research literature refers to: **[5th Dec. 2019-IInd Shift]**
(A) Identifying under-researched areas
(B) Recognizing the gap between two researchers' background
(C) Identifying inconsistent findings in an area of research
(D) Recognizing gap in the characteristics of sample and population

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Select correct option:

(a) (A) and (C) only (b) (B) and (D) only
(c) (A) and (B) only (d) (C) and (D) only

89. Which one of the following represents the correct order of sequence for reading skills in the context of research? **[6th Dec. 2019-Ist Shift]**

(a) Read, question, recall, review, survey
(b) Questions, survey, read, recall, review
(c) Recall, review, survey, question, read
(d) Survey, question, read, recall, review

90. Which of the two statements from the following statements are correct? **[4th Dec. 2019-IInd Shift**

(A) Sampling - related error is subsumed under the category non-sampling error
(B) Sampling error doesn't occur in multi-stage cluster sampling
(C) Inaccurate sampling Erame and non-response are examples of sampling - related error.
(D) There is an inverse relation between heterogeneity of population and sampling error.

Choose the correct option :

(a) (A) and (C) only (b) (A) and (D) only
(c) (B) and (D) only (d) (B) and (C) only

91. Which stage in research creates a working thesis for the research paper by specifying and organizing the category of information? [**21st June 2019-IInd Shift]**

(a) Research design
(b) Developing a hypothesis
(c) Review of literature
(d) Analysis of data

92. A hypothesis should be conceptually: **[24th June 2019-IInd Shift]**

(a) convoluted, complex and generic
(b) complex, tough and general
(c) simple, clear and specific
(d) obscure, complicated and simple

93. In which of the following sampling methods employed in research, the units comprising the sample are given equal and independent chance? **[2nd Dec. 2019-IInd Shift]**

(a) Stage sampling
(b) Cluster sampling
(c) Dimensional sampling
(d) Snowball sampling

94. In which type of qualitative research designs, individual stories to describe the lives of people are explored? **[2nd Dec. 2019-IInd Shift]**

(a) Ethnography
(b) Grounded theory research
(c) Symbolic interaction
(d) Narrative research

95. In a research problem 'studying the effect of Teaching Methods on the Scholastic Achievement of boys and girls in terms of their socio-economic background', which can be designated as independent variable? **[2nd Dec. 2019-Ist Shift]**

(a) Scholastic achievement
(b) Teaching methods
(c) Gender
(d) Socio-economic background

96. In the process of conducting research 'Formulation of Hypothesis" is followed by **[2nd Dec. 2019-Ist Shift]**

(a) Statement of Objectives
(b) Analysis of Data
(c) Selection of Research Tools
(d) Collection of Data

97. Suppose you want to investigate the working efficiency of nationalised bank in India, which one of the following would you follow? **[2nd Dec. 2019-Ist Shift]**

(a) Area Sampling (b) Multi-stage Sampling
(c) Sequential Sampling (d) Quota Sampling

HINTS & EXPLANATION

1. (c) The general steps of scientific research are:
Observing phenomena and formulating a question; conducting background study; formulating a hypothesis; conducting experiments for verification/ testing of hypothesis; drawing conclusions; stating the theory based on the conclusion/result.

2. (a) When statistical methodology is already adopted, the researcher would have no concern with the availability of methodologies. First and foremost, he should be adequately concerned about the collection of required data; once collected, its analysis can appropriately be done to arrive at a conclusion.

3. (b) Levelled or stratified random sampling is a feasible method of sampling when the target population is very large. It involves dividing the entire population into smaller homogeneous groups known as strata based on members' shared attributes or characteristics; and collecting random samples from each stratum.

4. (a) Historical research examines past events to draw conclusions and make predictions about the future. Historical research involves using primary and secondary sources. In essence, primary sources are the original documents, books, objects, records or data that one investigates. Secondary sources are the interpretation, analysis or commentary about a primary source.
Books and records are secondary sources of data in the other methods

5. (d) Quantitative method involves objective statistical measurements and analysis of data collected through polls, questionnaires, and surveys, or by manipulating pre-existing statistical data using computational techniques. Hence, a statistical quantitative method must be appropriate, not flexible to be valid and reliable. As it involves statistics, it must be measurable and comparable.

6. (a) The right order of the stages of research is:

Determining the objective; preparing scheme of observation; analysing the observations obtained; interpreting the conclusion drawn.

7. (d) The first step in the research process is to identify a problem or develop a research question.

The subsequent steps of research are:

- Extensive Literature review/survey
- Specifying the purpose of research
- Determining specific research questions
- formulating Hypothesis /a set of hypotheses
- Preparing the Research Design
- Choice of a methodology
- Sampling
- Data collection
- Data Analysis Verify
- Hypothesis Testing Analyzing and interpreting
- Generalization and Interpretation
- Reporting and evaluating research

8. (d) A ratio represents the relation between part and part; part and whole; whole and whole.

9. (d) All of the above

A research problem is feasible only when it is researchable; has utility and relevance; or, is new and adds something to knowledge.

10. (b) The null hypothesis (H 0) is a hypothesis which the researcher tries to disprove, reject or nullify. It states that there is no statistical relationship between the two variables or measured phenomena in the population and that the relationship in the sample suggested by the alternative hypothesis reflects only a sampling error.

Analysis of Variance **(ANOVA)** is a parametric statistical technique used to compare data or analyze the differences or variation among group means and their associated procedures. **(ANOVA)** is appropriate to compare means of a continuous variable in two or more independent comparison groups. So, ANOVA is used for null hypothesis testing.

The **t test** is a type of inferential statistics used to determine whether there is a significant difference between the means of two groups, assuming the dependent variable fits a normal distribution.

The $\mathbf{X^2}$ or Chi Square Test involves the use of parameters to test the statistical significance of the observations under study.

Factor analysis is a statistical method used to describe variability among observed, correlated variables in terms of a potentially lower number of unobserved variables called factors.

11. (c)

12. (c) It is a probability sampling method in which sample members from a larger population are selected according to a random starting point and a fixed, periodic interval. This is possible only when the population size is finite, e.g., a systematic sampling of 100 data points in a population of 1,000 would involve observing every 10th data point. Area sampling is done when no complete frame of reference is available; purposive sampling is judgemental in logically assuming he sample to be representative of the population.

13. (c) The correlation coefficient is a statistical measure that calculates the strength/degree of relationship between two variables; ranging between 1.0 (a perfect positive relationship) and -1.0 (a perfect negative relationship).

14. (b) Sampling follows the following principles:

- Large sample size so that true characteristics of the population are revealed
- Clearly defined sample units for objectivity and optimization (optimum results with maximum efficiency and minimum cost)
- Random sample selection so that each and every unit of the universe has an equal probability of being selected
- Systematic sampling and same units of sample used throughout the study for objectivity and validity

15. (b) Experimental studies seek to verify the truth (accuracy corresponding to reality) or falsity (inaccuracy) of a hypothesis, which is a proposed explanation for some phenomena that can be tested by manipulating an independent variable and observing the effects on a dependent variable.

Normative studies seek to clearly define the study population, outline the hypothesis under research, use scientific method to gather relevant data and appropriately interpret the results.

Survey method seeks to test a hypotheses about aspects/ characteristics/nature/attitude of relationships within a population.by questioning individuals and describing their responses.

Historical studies use primary sources and other evidence, including the evidence of archaeology, to research and write accounts of the past. No hypothesis is required in this method.

16. (c) The deciding factors, in order of priority, for the selection of research problem are:

- Relevance/significance in society
- Researcher's interest
- Suitability to the researcher's qualifications and training
- Availability of relevant resources
- The expenses involved
- The time required

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17. (b) Refer to answer 5 above.

18. (b) Non-probability sampling is a sampling technique which does not give all the individuals in the population equal chances of being selected, e.g.,

Convenience Sampling—samples are selected being accessible to the researcher or easy to collect.

Consecutive sampling—selecting all accessible subjects making the sample a better representation of the entire population.

Quota Sampling—selection ensures equal or proportionate representation of subjects per trait considered as basis of the quota for a given sample size

Judgmental Sampling or purposive sampling—selecting with the belief that some subjects are more suitable than other individuals for the purpose.

Snowball Sampling—selecting a subject who is asked to identify another potential subject meeting the research criteria. Snowball sample is hardly representative of the population.

A probability sampling utilizes some form of random selection method that ensures that the different units in the population have equal probabilities of being chosen, e.g.,

Simple Random Sampling— drawing a name out of a lot, or using computers for generating random numbers.

Stratified Random Sampling—randomly selecting from smaller group divisions of a large population that usually don't overlap but represent the entire population together.

Cluster random sampling—randomly selecting participants from select areas (i.e. cities or counties) when they are geographically spread out.

Systematic Sampling—randomly selecting every "nth" individual to be a part of the sample according to a random starting point and a fixed periodic interval.

19. (c) A dependent variable is the variable a researcher studies to solve a research problem. Merely containing independent and dependent variables does not make a research problem feasible. It is feasible if it satisfies any of the other conditions (options).

20. (b) Stratified sampling techniques are generally used when the population is heterogeneous but contains certain homogeneous or similar sub-populations which can be isolated and sampled independently.

21. (d) Factor analysis is the statistical method of describing variability among multiple observed (correlated) variables in terms of a potentially lower number of unobserved variables called factors. This is done by extracting maximum common variance from all variables and putting them into a common score. The driving concept involved here is that multiple observed variables have similar patterns of responses as they are all associated with a latent (i.e., not measured directly) variable.

22. (a) When there is no difference between the variables

A **null hypothesis** is a hypothesis that states that no statistical significance exists in a set of given observations. It is the hypothesis that the researcher is trying to disprove.

23. (a) The broad steps of research are:

- Searching sources of information to locate problem
- Identification of research problem
- Survey of related literature
- (Re)searching for solutions to the problem

24. (c) Objectivity in research implies, researchers should not allow their personality, beliefs or values to influence their tests / findings. A common test demands much priority on objectivity because it is reliability and usability depend on objectivity.

25. (c) A sociogram is a graphic representation of the interpersonal relationships within a social group situation for the purpose of discovering group structure or network of relationship patterns and sub-group organization.

26. (d) Skewness is a measure of the asymmetry of the probability distribution of a real-valued random variable about its mean.

A normal curve is a bell-shaped curve which shows a normal distribution. So, it has a bilateral symmetry or zero skewness.

27. (b) A continuous variable is a variable that can take an infinite number of possible values between any two observed values. It is usually measured rather than counted; and, may represent measurements even in the form of fractions or decimals, So, the continuous variable forms an interval on the number line e.g., height of a category of people, time taken by individuals to complete a task, Blood Pressure readings, , etc. A continuous variable is the opposite of a discrete variable, which can only take on a certain number of values.

Intelligence (IQ) is given in exact number; so, it is a discrete variable.

28. (d)

29. (d) supposition

A hypothesis is a supposition or proposed explanation made on the basis of limited evidence as a starting point for further investigation.

30. (d) Probability sampling is a method of sampling, in which the items of the population have an equal opportunity to be selected, e.g, Simple Random Sampling, Stratified Sampling, Cluster Sampling, Systematic Sampling.

Nonprobability sampling is a sampling technique wherein, it is not known which individual from the population will be selected as a sample, e.g., Convenience Sampling, Quota Sampling, Judgment or Purposive Sampling Snowball Sampling.

In stratified sampling, the researcher divides the population into separate strata and draws a probability sample (often a simple random sample) from each.

31. (d) All the other statements on hypothesis are true. A hypothesis is a testable statement or proposed explanation based on limited knowledge on which the research is based. It is not assumed to be true as its veracity is yet to be tested in the research.

32. (b) Steps of research are as follows:
ldentification of research problem; Listing of research objectives; Formulation of a testable hypothesis, Methodology(planning and performing experiment); Selection of research tools; Collection of data-data analysis-results or conclusions; discussion communication of conclusion.

33. (c) a provisionally accepted hypothesis for further research.
A working hypothesis is one that is provisionally accepted as a basis for further research, assuming that a tenable theory will come up, even if the hypothesis ultimately fails.

34. (b) Communalities indicate the amount of variance in each variable that is accounted for. Initial communalities are estimates of the variance in each variable accounted for by all components or factors.
Factor analysis is a technique that is used to reduce a large number of variables into fewer numbers of factors. This technique extracts maximum common variance from all variables and puts them into a common score.

35. (a) Selection of topic, review of literature, data collection, interpretation of findings.

36. (b) Sampling process error occurs because researchers draw different subjects from the same population but still, the subjects have individual differences. The most common re-sult of sampling error is systematic error wherein the results from the sample differ significantly from the results from the entire population. Sampling error decreases with the in-crease in sample size.

37. (a) Co-variation, Elimination of Spurious Relations, Generalisation, Theorisation.

38. (a) Theoretically, a parametric test is one that makes assumptions about the parameters (defining properties) of the population distribution(s) from which one's data are drawn, while a non-parametric test is one that makes no such assumptions. In practice, 'parametric' refers to tests, such as **t-tests** and the **analysis of variance,** that assume the underlying source population(s) to be normally distributed; 'non-parametric' refers to tests that do not make these particular assumptions.
Sign test, Chi-square test, and Run test are non-parametric tests.

39. (c) Quota Sampling
Probability sampling is a method of sampling, in which the items of the population have an equal opportunity to be selected, e.g, Simple Random Sampling, Stratified Sampling, Cluster Sampling, Systematic Sampling.
Nonprobability sampling is a sampling technique wherein, it is not known which individual from the population will be selected as a sample, e.g., Convenience Sampling, Quota Sampling, Judgment or Purposive Sampling Snowball Sampling.

40. (d) Probability sampling is a method of sampling, in which the items of the population have an equal opportunity to be selected, e.g, Simple Random Sampling, Stratified Sampling, Cluster Sampling, Systematic Sampling.
Nonprobability sampling is a sampling technique wherein, it is not known which individual from the population will be selected as a sample, e.g., Convenience Sampling, Quota Sampling, Judgment or Purposive Sampling Snowball Sampling.

41. (d) A control variable is the only element that remains unchanged throughout an experiment, its unchanging state allowing the relationship between the other variables being tested to be better understood.

42. (d) Statistics The population parameter is the population information or number that describes the population The corresponding sample information is known as Sample Statistics.
Sample universe is the data from which a sample is drawn.
Sample design includes the Sampling method (the rules and procedures by which the sample is taken) and the Estimator (the process for calculating sample statistics).
Statistical inference is the process of deducing properties of a population by testing hypotheses and deriving estimates from the observed data set sampled from a larger population.

43. (d) Randomisation
Lottery is a method of selecting a random winner where the outcome is a matter of chance. In sampling too, likewise, the lottery method is used for creating a simple random sample. A researcher randomly picks numbers, with each number corresponding to a subject or item, in order to create the sample.

44. (b) Non-probability sampling is a sampling technique where the samples are gathered in a process that does not give all the individuals in the population equal chances of being selected.
A purposive sample is a non-probability sample that is selected based on characteristics of a population and the objective of the study. Purposive sampling is also known as judgmental, selective, or subjective sampling.
Simple random sampling is a probability sampling method where the elements are selected in a random manner so that every item in the population stands an even chance/probability of being selected in the sample.
Systematic sampling is a probability sampling method where the elements are chosen from a target population by selecting a random starting point and selecting other members after a fixed 'sampling interval'. Sampling interval is calculated by dividing the entire population size by the desired sample size. Stratified sampling is a probability sampling method wherein items are selected from different strata of the population, rather than at random from the whole population, in order that it should be representative.

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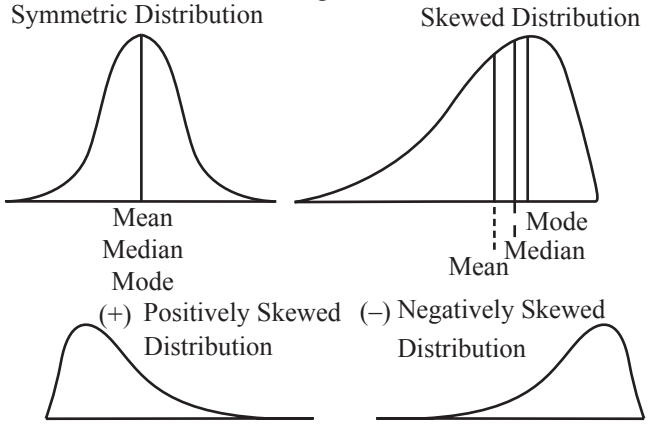
45. (d) Sampling Cases' means sampling of people, newspapers, television programmes, etc.

46. (c) **Skewness** is the measure of symmetry, or more precisely, the lack of symmetry of a statistical distribution, or data set, on the left and right of the central axis.

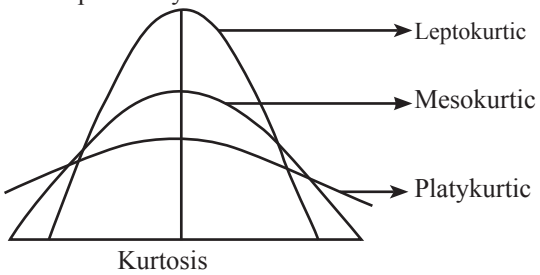


Kurtosis is the sharpness of the peak of a frequency-distribution curve, i.e., a measure of whether the data are heavy-tailed or light-tailed relative to a normal distribution.

Leptokurtic distributions are statistical distributions where there are extreme points along the X axis, resulting in a higher kurtosis than found in a normal distribution.

Mesokurtic distributions have a kurtosis of zero, matching that of the normal distribution, or normal curve, also known as a bell curve.

Platykurtic distributions have the peak of the curve comparatively flatter than that of normal distribution.



47. (b) Null refers to 'no difference'. Null hypothesis is the hypothesis that there is no significant difference between specified populations, any observed difference being due to sampling or experimental error. The specified populations here are male and female students.

A research hypothesis is a specific, clear, and testable proposition or predictive statement about the possible outcome of a scientific research study based on a particular property of a population.

A directional hypothesis is a prediction made by a researcher regarding a positive or negative change, relationship, or difference between two variables of a population

A statistical hypothesis, sometimes called confirmatory data analysis, is a hypothesis that is testable on the basis of observing a process that is modelled via a set of random variables.

48. (b) A hypothesis is a tentative statement about the relationship between two or more variables. It is a specific, testable prediction about what you expect to happen in a study. Generation of the hypothesis is the beginning of a scientific process. It refers to a supposition, based on reasoning and evidence. The researcher examines it through observations and experiments, provides facts and forecasts possible outcomes. The hypothesis can be inductive or deductive, simple or complex, null or alternative. While the null hypothesis is the hypothesis, which is to be actually tested, the alternative hypothesis gives an alternative to the null hypothesis.

49. (b) Steps of research process are:

1. Selection of Research Problem
2. Extensive Literature survey
3. Making Hypothesis
4. Preparing the Research Design
5. Sampling
6. Data collection
7. Data Analysis
8. Hypothesis Testing
9. Generalization and Interpretation
10. Preparation of Report

50. (b) The research hypothesis will be accepted.

51. (c) Problem formulation, Hypothesis making....

Steps in Research Process in Research Methodology are as follows:

1. formulating the research problem;
2. extensive literature survey;
3. developing the hypothesis;
4. preparing the research design;
5. determining sample design;
6. collecting the data;
7. execution of the project;
8. analysis of data;
9. hypothesis testing;
10. generalizations and interpretation, and
11. preparation of the report or presentation of the results, i.e., formal write-up of conclusions reached.

52. (b) A scientific method first perceives the problem situation then locates the actual problem and its definition; then the hypothesis or testable explanation is laid out and the consequences of the suggested solution are drawn; then the hypothesis in action is tested.

53. (a) Experimental approach

A cause-effect relationship involves a particular independent variable affecting the dependent variable of interest (the effect) or an event (the cause) making another event happen (the effect). One cause can have several effects.

In an experimental approach, the researcher carefully controls the treatment/cause/the independent variable and then measures the outcome of interest/effect/the dependent variable. So, there is a direct and strong cause and effect relation.

In a correlational approach, positive (directly proportional) or negative (inversely proportional) relation is studied in the two variables.

Descriptive statistics seeks to describe the data collected from the sample to the whole population

unlike inferential statistics as opposed to inferential statistics that attempts to make inferences.

Non-experimental research, unlike experimental research generally cannot provide strong evidence that changes in an independent variable can cause differences(effects) in a dependent variable.

54. (a) Variable

A variable is assigned with changing values that are measurable.

55. (b) Validity is the extent to which a concept, conclusion, test or measurement accurately provides what it's supposed to; or, corresponds accurately to the real world.

Reliability is the degree to which the result of a measurement, calculation, or specification obtained by administering the same test twice over a period of time to a group of individuals can be depended on to produce stable and consistent results.

Tests that are valid are also reliable. Evaluation techniques are valid as they measure what a student has learnt in a particular period/term and therefore they are also reliable However, tests that are reliable aren't always valid, e.g., if a clock is five minutes slow it would be reliable, measuring the same duration correctly every time; but, it would not be valid as it would not be showing the right time.

56. (c) Statistics

Parameters are numbers that summarize data (description of the characteristics) of the entire target population, while statistics are numbers that summarize data from a sample, i.e. some subset of (or a small group within) the entire population.

57. (c) An F-test is used to test if the variances of two populations are equal. It can be a two-tailed test or a one-tailed test. The two-tailed version tests that the variances are not equal. The one-tailed version only tests in one direction, i.e., whether the variance from the first population is greater than or less than (never both) the second population variance. The selection is determined by the problem or the hypothesis. For example, while testing a new process, one may only be interested in knowing if it is less variable than the old process.

58. (b) A null hypothesis is a precise statement or proposition that undergoes verification to determine if it should be accepted or rejected in favour of an alternative proposition. The null hypothesis usually states that there is no statistical significance between the two variables in the hypothesis.and is expressed as "There is no relationship between two quantities." A researcher aims to disprove it to demonstrate that there is a statistically-significant relationship between the two variables in the hypothesis. This is the basis of the success of the research study.

59. (d) An evaluation plan is a documented roadmap that describes how the project/program will be monitored and evaluated as well as how the evaluation results propose program improvement and decision making. It informs about the purpose, context and subject of the evaluation; and describes the goals and outcomes of the program being evaluated, the resources/ sample for the evaluation, and the process of data analysis.

60. (d) A research hypothesis (H1) is a statement created by researchers when they speculate upon the outcome of a research or experiment. It is a supposition or proposed explanation made on the basis of limited evidence as a starting point for further investigation.

61. (c) Primary sources contain original thinking, report on new discoveries, or share fresh information. Secondary sources offer an analysis or restatement of primary sources.

Tertiary sources index, abstract, organize, compile, or digest primary and secondary sources. Reference materials and textbooks are considered tertiary sources when their chief purpose is to list, summarize or simply repackage ideas or other information. Tertiary sources are usually not credited to a particular author.

Examples of Tertiary Sources: Dictionaries / encyclopaedias (may also be secondary), almanacs, fact books, Wikipedia, bibliographies (may also be secondary), directories, guidebooks, manuals, handbooks, and textbooks (may be secondary), indexing and abstracting sources.

62. (a) Critical language testing (CLT) refers to the examination of the uses and consequences of tests in education and society. Critical language testing (CLT) is a philosophical approach that states that there is widespread bias in language testing. This view is derived from critical pedagogy, which views education as a process manipulated by those in power.

63. (c) A dependent variable is the one which is measured in terms of the effect of the independent variable on it.

The teacher is to study how the **scholastic performance** of different students varies **depending** on the level of aspiration in terms of their socio-economic background.

64. (b) The steps of experimental research are:

State the research problem
Determine if experimental methods apply
Specify the independent variable(s)
Specify the dependent variable(s)
State the tentative hypotheses
Determine measures to be used
Pause to consider potential success
Identify intervening (extraneous) variables
Formal statement of research hypotheses
Design the experiment
Final estimate of potential success
Conduct the study as planned
Analyze the collected data
Prepare a research report

65. (b) Research design is a broad and comprehensive action plan or strategy formulated by researcher for obtaining the answers of research question. The research design explains the type of research (experimental, survey, correlational, semi-experimental, review) and also its sub-type (experimental design, research problem, descriptive case-study). The main sections of research design are: sample selection, formulation of research

plan, tool selection, data collection and data analysis.

So, A, B, C are its features.

66. (c) The halo effect is a type of cognitive bias wherein some trait or impression of a person or thing influences a judgment of that person or thing; or impacts an evaluations of that person's other specific traits. It supports rapid decisions, even if biased ones.

One common example of the halo effect is the on screen impression of movie stars as admirable and endearing influencing people to see them as intelligent and humane, too.

67. (a) Formulation of a research problem is the first step in research which prepares the basic groundwork on which the whole process of research is structured, just as the whole building is constructed on its foundation.

68. (b) In an experimental research, first variables of interest are identified; then, one or more of these variables, referred to as the factors (independent variables) of the study, are controlled so that data may be obtained about how the factors influence another variable referred to as the response variable, or dependent variable. So, the observations derived from dependent variables are considered for the statistical analysis which leads to the conclusion of the research.

69. (c) Regression to the mean occurs whenever a non-random sample is selected from a population and two imperfectly correlated variables are measured, such as two consecutive blood pressure measurements. The less correlated the two variables, the larger the effect of regression to the mean. Also, the more extreme the value from the population mean, the more room there is to regress to the mean. So, whenever a group is selected with extreme values for one variable and another variable is then measured, the regression effect is high.

70. (d) The scientific method has the following basic steps:

1. Making an observation
2. Identifying a research question
3. Forming a concept, hypothesis, or testable explanation
4. Making a prediction or theory based on the hypothesis
5. Testing the prediction and deducing the consequences
6. Adopting a method to verify results

71. (a) The **experimental method** is a systematic and scientific **approach** to research in which the **researcher** manipulates one or more variables, and controls and measures any change in other variables. Hypothesis testing is a statistical analysis of experimental data for making statistical decisions about whether to accept or reject the null hypothesis. Every test in hypothesis testing produces the significance value for that particular test. If the significance value of the test is **greater** than the predetermined significance level, then the null hypothesis is accepted, if it is **less**, the null hypothesis is rejected.

72. (a) Probability Sampling is a sampling technique in which sample from a larger population are chosen using a method based on the theory of probability using random selection. Action research and phenomenology involves the active participation of the researcher in the field. Also, probability sampling is generally used in quantitative research. Of the given options, (a) Survey researches;(b) Experimental researches; and (e) Correlational design based researches are quantitative methods.

73. (d) Empirico-inductive research is quantitative. Inductive approach starts with observations which are searched for any pattern existing within. It aims to generate meaning/explanation from the data set collected by direct/ indirect observation or experience, and identify patterns and relationships (premises) existing amidst them to inductively construct a theory. Its conclusions are strictly drawn from concretely empirical evidence, which is verifiable, and they are generalisable. Generalization is an act of reasoning that involves drawing broad inferences from particular observations and is widely-acknowledged as a quality standard in quantitative research. So, the sampling procedure appropriate for this kind of research will be any non-probabilty technique.

74. (a) Contrary to option (a), purposive sampling is indeed the fundamental principle for selecting cases and individuals in qualitative research.

75. (b) Stratified random sampling works best in case of a heterogeneous population. It is a method of sampling that involves the division of a population into smaller sub-groups known as strata, on the basis of the members' shared attributes or characteristics such as income or educational attainment.

Simple random sampling is suitable to a homogenous population. It involves separate random selection of each household.

Cluster sampling Cluster sampling is simple random sample is taken from each of the different clusters in the population. Multiple clusters of people are created from a population where they are indicative of homogeneous characteristics and have an equal chance of being a part of the sample.

Systematic random sampling does not involve separate random selection of each household. It is often used to select large samples from a long list of households and therefore, proceeds in a systematic manner, selecting every nth member of population to be included in the study.

76. (d) Random sampling is a sampling technique in which each sample has an equal probability of being chosen. A sample chosen randomly is meant to be an unbiased representation of the total population.

The Fish Bowl draw is an easy procedure if the total population is small. Each element is numbered on separate slips of paper which are kept into a box; and the required number, according to the sample size decided, is randomly picked out one by one.

Two (or more) samples are called independent if the members chosen for one sample do not determine which individuals are chosen for a second sample. Two (or more) samples are called dependent if the members chosen for one sample automatically determine which members are to be included in the second sample. Fish bowl method can be used for collecting either. The method is random, so, not structured.

77. (d) Non-probability sampling is a sampling technique which does not give all the individuals in the population equal chances of being selected, e.g.,

Convenience Sampling — selecting samples that are accessible to the researcher or easy to collect.

Consecutive sampling — selecting all accessible subjects making the sample a better representation of the entire population.

Judgmental Sampling or purposive sampling — selecting with the belief that some subjects are more suitable than other individuals for the purpose.

Snowball Sampling — selecting a subject who is asked to identify another potential subject meeting the research criteria (Snowball sample is hardly representative of the population).

Quota Sampling — selecting sample that ensures equal or proportionate representation of subjects per trait considered as basis of the quota for a given sample size.

Dimensional Sampling (an extension of quota sampling) — the researcher takes into account several characteristics (e.g. gender, income, residence and education) and ensures that there is at least one person in the study representing each of the chosen characteristics.

Probability sampling, on the other hand, utilizes some form of random selection method that ensures that the different units in the population have equal probabilities of being chosen, e.g.,

Simple Random Sampling — drawing a name out of a lot, or using computers for generating random numbers.

Stratified Random Sampling — randomly selecting from smaller group divisions of a large population that usually don't overlap but represent the entire population together.

Cluster random sampling — randomly selecting participants from selects areas (i.e. cities or counties) when they are geographically spread out.

Systematic Sampling — randomly selecting every "nth" individual to be a part of the sample according to a random starting point and a fixed periodic interval.

78. (c) Correlation analysis is a method of statistical evaluation to establish if there are possible connections between variables. It studies the strength of a relationship between two, numerically measured, continuous variables (e.g. height and weight).

79. (a) Snowball sampling employs participants' social networks to access specific populations. It is a sampling technique where a researcher picks the first few samples and either recruits them or asks them to recommend other subjects they know who fit the description of samples needed. This referral technique goes on and on, increasing the size of the respondent population like a snowball rolling down a hill until the researcher has sufficient data to analyze. Snowball sampling is also called chain referral sampling.

80. (a) In the cross-sectional as well as the longitudinal studies, researchers observe and record information about their subjects without manipulating the study environment. However, while in a longitudinal study, several observations of the same subjects are conducted over a period of time, sometimes lasting many years, in a cross-sectional study different population groups are compared at a single point in time.

81. (d) A research **hypothesis** is a specific testable proposition about the possible outcome of a scientific research study based on a particular property of a population, such as presumed differences between groups on a particular variable or relationships between variables. A research **problem** is a statement about an area of concern, a condition to be improved, a difficulty to be eliminated, or a troubling question that exists in scholarly literature, in theory, or in practice that points to the need for meaningful understanding and deliberate investigation. A research **proposal** is a document proposing a research project, generally in the sciences or academia, and generally constitutes a request for sponsorship of that research. Research **design** is defined as a framework of methods and techniques chosen by a researcher to combine various components of research in a reasonably logical manner so that the research problem is efficiently handled.

82. (c) There are two main categories of tests: Maximum Performance Tests & Typical Response Tests. Typical performance is how one performs on a regular basis, while maximum performance is how one performs when exerting as much effort as possible. Maximum Performance Tests are designed to test a persons' knowledge and abilities. These are: intelligence, aptitude & achievment tests. Personality tests and attitude tests.

83. (a) The logical steps of research process are:

Identifying and defining a research problem

- Literature review
- Formulating a hypothesis
- Determining research design
- Determining sample design
- Data collection and analysis
- Testing of hypothesis
- Reporting the results

84. (c) Identifying variables and hypothesizing is a creative activity. The area of study may have extraneous variables likely to lead the proposed study astray; so, the researcher has to use their imagination to identify the pertinent variables that could create the hypothesis in the best expression possible; and accordingly, give form and structure to the study they propose to undertake.

The other steps mentioned do not need creativity.

- Identifying the research problem and defining it is a rational theoretical step taken by the researcher on the basis of personal interest, choice and capability for research in the specific subject area.
- Figuring out the related studies and the techniques used by other researchers needs focus and diligence but not creativity.
- Data analysis and presentation of results is a strictly statistical process requiring no creativity.

85. (c) There are two Main Types/Categories of tests:'
1. Maximum Performance Tests
2. Typical Response Tests

Maximum Performance Tests are designed to test knowledge and abilities because of which responses can either be correct or incorrect. Ex. Achievement & Aptitude test.

Typical Response Tests measure things like personality, behaviour, attitudes or interests. Ex. Objective & Projective personality tests.

86. (d) Questionnaire and interview- nominal scale of measurement

Intelligence and aptitude tests - interval scale of measurement

Attitude and value tests – ordinal scale of measurement

Speed and frequency tests--ratio scale of measurement

87. (c) A good literature review has four main aims:
- To survey the literature in the chosen area of study.
- To synthesise and summarise the information in it.
- To critically analyse the information gathered, i.e., raise research questions and validate them: by identifying gaps in current knowledge; showing limitations of theories and points of view; formulating areas for further research; and reviewing areas of controversy.
- To reorganise the literature suitably in accordance with the study at hand.

88. (a) Spotting gaps refers to identifying under-researched areas and inconsistent findings in an area of research.

89. (d) Survey, question, read, recall, review

90. (a) Statements (a) and (c) are correct.

(a) Sampling- related error is subsumed under the category non-sampling error.

(c) Inaccurate sampling frame and non-response are examples of sampling- related error.

Sampling error is the deviation of the selected sample from the true characteristics, traits, behaviours, qualities or figures of the entire population.

Errors which are due to the factors other than sampling are called non-sampling errors.

A non-sampling error occurs during data collection, causing the data to differ from the true values. It can be of different kinds.

Sampling related error occurs when a unit in the sample is incorrectly excluded or included, or is duplicated in the sample. This happens in case of inaccurate sampling frame OR partial or complete non-response—when data is not obtained owing to absence, non-contact, refusal, or some other reason OR response error caused by respondents providing inaccurate responses, intentionally or accidentally,

Interviewer error caused by incorrect record of information owing to bias, influence or false assumptions.

Processing error that may occur during data collection, data entry, coding, editing or output.

91. (c) Every study has a main idea or central message reflected by the arguments in the paper. A working thesis gives the researcher the focus and direction to proceed, and at the same time, also gives the freedom to change as the study progresses. As per the steps of research shown below, review of literature helps create a working thesis.

The steps of research process are:
1. Identification/Selection of Research Problem
2. Extensive Literature Survey/Review
3. Creation of Hypothesis
4. Preparing of Research Design
5. Sampling
6. Data collection
7. Data Analysis
8. Hypothesis Testing
9. Generalization and Interpretation
10. Preparation of Research Report

92. (c) A hypothesis should be **simple** and **clear** rather than obscure/convoluted/complex or complicated. It cannot be generic because the research is **specific**.

93. (b) Cluster sampling is one of the probability sampling methods in which samples from a larger population are chosen on the theory of probability, i.e., a random selection so that each member stands an equal and independent chance of being selected.

94. (d) Narrative research is a literary form of qualitative research that involves writing narratives/descriptions/ stories about experiences of individuals and discussing their meaning with the individual.

95. (b) The independent variable is that which affects the dependent variable; so, it is manipulated and controlled and its effect on the latter is measured. So, the teaching method is the independent variable here.

96. (c) Steps of research are as follows:

Identification of research problem; Listing of research objectives; Formulation of a testable hypothesis, Methodology(planning and performing experiment); Selection of research tools; Collection of data-Data analysis-results or conclusions; discussion/ communication of conclusion.

97. (b) Multi-stage Sampling

Multistage sampling is carried out in stages using smaller and smaller sampling units at subsequent stages. In a two-stage sampling design, a sample of primary units is selected and then another sample of secondary units is selected within each primary unit. Working efficiency of a nationalised bank can be found by smaller sampling units at every stage as one moves up the hierarchy.

Area sampling is used when no complete frame of reference is available by dividing the total area under investigation into small sub-areas which are sampled.

Quota sampling is a non-probability sampling technique wherein the collected sample has the same proportions of individuals as the entire population with respect to known characteristics, traits or focused phenomenon.

Sequential sampling is a non-probability sampling technique done in a sequence wherein a single or a group of subjects is selected in a given time interval, studied, and results analyzed; then another group of subjects is selected if needed and so on.

CHAPTER 10

Thesis and Article Writing

THESIS AND ARTICLE WRITING

Parts/Sections in a Research Report

1. Title/Cover Page
2. Certificate of Originality
3. Acknowledgements
4. Abstract
5. Introduction
6. Scope/ Limitations of the Study
7. Literature Review
8. Research Design
9. Data Analysis and interpretation
10. Conclusion
11. References/ Bibliography
12. Appendices

Formats and Styles of Referencing

I. APA Manual style

Example: (i) Carroll, J.P. (1966). Some neglected relationships in reading and language. Elementary English, 43, 511-582.

II. Chicago Manual style

REFERENCES:

Format: Author(s) Last name, First name. "Title of Article." Journal Title Volume, Issue no. (Year): pages.

FOOTNOTES:

Format: #. Author(s) First name Last name, "Title of Article," Journal Title Volume, Issue no. (Year): Page.

III. MLA style

Example:

Kushkova, Anna. "At the Center of the Table." *Russian Studies in History*, vol. 50, no.1, 2011, pp. 44-96

For **book**

Example:

Shelley, Mary. **Frankenstein**. Lackington, Hughes, Harding, Mavor & Jones, 1818.

IV. AMA Style

Example:

Economopoulos KJ, Brockmeier SF. Rotator cuff tears in overhead athletes. *Clin Sports Med*. 2012;31(4):675-692.

For **Journals**

For **book**

Example:

Laccetti MS, Kazanowski MK. *Pain Management*. Sudbury, MA: Jones and Bartlett Publishers; 2009.

V. Harvard Referencing style

For **journals**

More than three authors: Battisti, C, Fanelli, G, Bertolino, S, Luiselli, L, Amori, G & Gippoliti, S 2018, 'Non-native invasive species as paradoxical ecosystem services in urban conservation education', Web Ecology, vol. 18, no. 1, pp. 37-40.

For **books**

More than three authors: Puccio, GJ, Cabra, JF & Schwagler, N 2018, *Organizational creativity: a practical guide for innovators & entrepreneurs*, Sage, Thousand Oaks, CA.

Some Latin abbreviations often used in referencing

ibid.

This is the abbreviation of the Latin word *ibidem* (which means "in the same place") and, therefore, always has a period after it. When two consecutive notes from the same place are cited, **ibid**. is used for the reference of the second note. The purpose is to avoid repetition of the whole note all over again and direct the reader to the same source that was referred to for the preceding note.

In the Chicago style, works can be cited in either footnotes or endnotes as per the author's choice. The APA style doesn't use ibid. while the MLA style guide has begun to discourage the use of Latin abbreviations like ibid.

op.cit.

This is the abbreviation of the Latin phrase opere citato, meaning "in the work already cited". It refers to the work/source in a previous reference, though not the immediately preceding one; and, is preceded by the author's name and followed by the page number (s). The publication date is also included if more than one work by the same author is included in the references.

loc.cit.

This is an abbreviation of the Latin phrase *loco citato*, meaning 'in the place cited'. It refers to the work in the immediately preceding reference, and can be used instead of *ibid*. when all the citation details (including page numbers) are identical.

et al.

This is an abbreviation of the Latin phrase et *alii*, meaning 'and others'. When a work has more than two authors it is the common practice to name the first author only and follow it with **et al** to indicate that there are other authors, too.

GP_4358

Impact factor of a journal

The impact factor (IF) of a journal or journal impact factor of an academic journal is used as an indicator of the importance of a journal in its field. It was first introduced by Eugene Garfield, the founder of the Institute for Scientific Information. The impact factor (IF) of a journal is a measure of the frequency with which the average article in the journal has been cited in a particular year. It is a scientometric index that reflects the yearly average number of citations that recent articles published in the given journal received.

It is calculated for a two-year period by dividing the number of times articles contained in the journal were cited by the total number of 'citable' articles published in those two years.

Calculation of 2019 IF of a journal

A = the number of times articles published in 2017 and 2018 were cited by indexed journals during 2019.

B = the total number of "citable items" published in 2017 and 2018.

A/B = 2019 impact factor

The IF of a journal is not associated to the factors like quality of peer review process and quality of content of the journal. Journal which publishes more review articles will get highest IFs.

h-index of an academic

The h-index, or Hirsch index, measures the impact of a particular researcher/scientist/scholar rather than a journal. The h-index attempts to measure both the research productivity and citation impact of the publications of the researcher. It gives the highest number (h) of publications of a researcher that received h or more citations each, indicating that their other publications did not receive more than h citations each. For example, an h-index of 10 for a researcher means they published 10 papers, each of which was cited by others at least 10 times. The h-index of a particular researcher/scientist/scholar may be very different in different databases because databases index different journals and cover different years.

g-index of an academic

The g-index looks at overall record of a researcher's publications and is calculated on the basis of the distribution of citations received. For a given set of articles ranked in decreasing order of the number of citations that they received, the g-index is the unique largest number such that the top g articles received together at least g^2 citations. So, a g-index of 10 means that at least 10 published articles of the researcher/ academic have together received at least 10^2 or 100 citations by others.

A comparison

Unlike the h-index, g-index can be generated if even a small number of articles have received citations. Suppose, an academic with 20 papers, 16 of which have no citations while the remaining five have respectively 300, 65, 30, 5 and 2 citations (together 402, i.e., at least 20^2 or 400) would have a g-index of 20, but an h-index of 5 (i.e., 5 papers with at least 5 citations each).

RESEARCH PRESENTATION

Conference

A conference is a formal meeting where participants confer on specific topics or exchange their views on topics. It is a prearranged meeting where delegates hold consultation and discussion on a number of topics. It features keynote addresses and presentations and includes multiple breakout sessions. A conference **need not be academic** in nature and it can take place in different fields, such as educational institutions, sports, trade and commerce, journalism, medicine, research, and so on.

Symposium

A symposium is a small scale conference where the number of delegates is smaller, but it is held in a prestigious academic setting, generally leading venues in their respective fields. Here, experts in their respective fields present their talk/opinions on a chosen topic and the usual discussions follow. The chief characteristic of a symposium is that it **covers a single topic or subject** and all the lectures given by experts are **completed in a single day**. Conference and symposium are similar events where speakers come together and give their opinions on a chosen subject.

Seminar

A seminar is a form of **academic** instruction, offered either at a university or a commercial or professional organization. Its basic purpose is to bring together small groups for recurring meetings that focus on a chosen/particular subject each time, require everyone present to actively participate. The concepts and techniques are presented and discussed through a combination of visual materials, interactive equipment and demonstrations. Participants in a seminar receive some souvenir relating to the lecture.

Workshop

A Workshop has all the elements of the seminar, but, differs in one characteristic feature. It essentially involves "hand-on-practice" or laboratory work which is designed to reinforce, practice, imprint and implement the actual concept or technique taught/ learnt through the preceding lecture and demonstration process.

Webinar/ Web Conference

A Webinar/Web Conference is a seminar/conference held exclusively on the internet and attended by an online audience. It makes audio and video feeds of speaker(s), often including PowerPoint slides running in sync with the presentation, available to participants via a PC, Mac, tablet or smart phone.

Used effectively, it is a powerful form of one-to-many communication/interaction enabling a presenter to reach a large and specific group of online viewers from a single location. Smart tools, such as Survey, Poll, Test, Chat, Ask a question, etc., are essential to channelize interaction as participants may be large in numbers.

Colloquium

A colloquium is an informal academic meeting or seminar of a dual nature where an address is followed by a question and answer session/forum. Each of the participating scholars/researchers

delivers a talk/lecture on a different topic and follows it up by responding to questions based on it.

The basic purpose of a colloquium is to address contemporary academic concerns common to a particular group such as scientists, students doing a certain course, or educators by discussing and debating on cutting-edge research studies which can be followed by meetings to formulate policies. It is different from a regular conference or workshop in two ways. While it has a strictly academic theme, a conference/workshop is not necessarily of an academic nature with presenters not necessarily having any academic affiliation. Secondly, a conference/workshop usually follows a formal agenda while a colloquium is aimed at analyzing and discussing a particular topic and garnering the views of others on it.

Congress

A Congress is a formal association/gathering/assembly/conference of representatives of interest groups pertaining to a particular field. It is typically held once a year to discuss or decide on a specific question; is attended by leaders in that field; and, features a series of invited talks. It functions to highlight the achievements and notable results in that field.

Convention/ Meeting

A convention is a formal deliberative gathering/ assembly of mandated delegates who meet at an arranged place and time in order to discuss or engage in some issues of common interest. It features keynote speakers, displays, and other information and activities of interest to the participants who work to reach a formal agreement, contract, pact, treaty or supplement to such on a specific conduct for generations.

EXERCISE

1. A college wants to give training in use of Statistical Package for Social Sciences (SPSS) to researchers. For this the college should organise : **[December-2004]**
(a) Conference (b) Seminar
(c) Workshop (d) Lecture

2. Bibliography given in a research report: **[June-2007]**
(a) shows vast knowledge of the researcher
(b) helps those interested in further research
(c) has no relevance to research
(d) all the above

3. A research paper is a brief report of research work based on **[June-2011]**
(a) Primary Data only
(b) Secondary Data only
(c) Both Primary and Secondary Data
(d) None of the above

4. A group of experts in a specific area of knowledge assembled at a place and prepared a syllabus for a new course. The process may be termed as **[June-2011]**
(a) Seminar (b) Workshop
(c) Conference (d) Symposium

5. Workshops are meant for **[December-2011]**
(a) giving lectures
(b) multiple target groups
(c) showcase new theories
(d) hands on training/experience

6. When two or more successive footnotes refer to the same work which one of the following expressions is used ? **[June-2012]**
(a) ibid (b) et.al
(c) op.cit : (d) loc.cit.

7. Which one of the following references is written according to American Psychological Association (APA) format ? **[December-2012]**
(a) Sharma, V. (2010). Fundamentals of Computer Science. New Delhi : Tata McGraw Hill
(b) Sharma, V. 2010. Fundamentals of Computer Science. New Delhi : Tata McGraw Hill
(c) Sharma.V. 2010. Fundamentals of Computer Science, New Delhi : Tata McGraw Hill
(d) Sharma, V. (2010), Fundamentals of Computer Science, New Delhi : Tata McGraw Hill

8. Which one of the following is an indication of the quality of a research journal ? **[December-2012]**
(a) Impact factor (b) h-index
(c) g-index (d) i10-index

9. A research paper **[June-2013]**
(a) is a compilation of information on a topic.
(b) contains original research as deemed by the author.
(c) contains peer-reviewed original research or evaluation of research conducted by others.
(d) can be published in more than one journal.

10. Which one of the following references is written as per Modern Language Association (MLA) format ? **[June-2013]**
(a) Hall, Donald. Fundamentals of Electronics, New Delhi : Prentice Hall of India, 2005
(b) Hall, Donald, Fundamentals of Electronics, New Delhi : Prentice Hall of India, 2005
(c) Hall, Donald, Fundamentals of Electronics, New Delhi – Prentice Hall of India, 2005
(d) Hall, Donald. Fundamentals of Electronics. New Delhi : Prentice Hall of India, 2005

11. A workshop is **[June-2013]**
(a) a conference for discussion on a topic.
(b) a meeting for discussion on a topic.
(c) a class at a college or a university in which a teacher and the students discuss a topic.
(d) a brief intensive course for a small group emphasizing the development of a skill or technique for solving a specific problem.

12. In a thesis, figures and tables are included in **[June-2014]**
(a) the appendix (b) a separate chapter
(c) the concluding chapter (d) the text itself

13. A thesis statement is **[June-2014]**
(a) an observation (b) a fact
(c) an assertion (d) a discussion

14. The core elements of dissertation are **[December-2014]**
(a) Introduction; Data Collection; Data Analysis; Conclusions and Recommen-dations
(b) Executive Summary; Literature review; Data gathered; Conclusions; Bibliography
(c) Research Plan; Research Data; Analysis; References
(d) Introduction; Literature Review; Research Methodology; Results; Discussion and Conclusion

15. When academicians are called to deliver lecture or presentations to an audience on certain topics or a set of topics of educational nature, it is called **[December-2014]**
(a) Training Program (b) Seminar
(c) Workshop (d) Symposium

16. A good thesis writing should involve : **[June-2015]**
(A) reduction of punctuation and grammatical errors to a minimum.
(B) careful checking of references.
(C) consistency in the way the thesis is written.
(D) a clear and well written abstract.
Select the correct answer from the codes given below :
(a) (A), (B), (C) and (D) (b) (A), (B) and (C)
(c) (A), (B) and (D) (d) (B), (C) and (D)

17. Which of the following are the basic rules of APA style of referencing format ? **[December-2015]**
(A) Italicize titles of shorter works such as journal articles or essays
(B) Invert authors' names (last name first)
(C) Italicize titles of longer works such as books and journals
(D) Alphabetically index reference list
Select the correct answer from the codes given below :
(a) (A) and (B) (b) (B), (C) and (D)
(c) (C) and (D) (d) (A), (B), (C) and (D)

18. Which of the following are the characteristics of a seminar? **[December-2015]**
(A) It is a form of academic instruction.
(B) It involves questioning, discussion and debates.
(C) It involves large groups of individuals.
(D) It needs involvement of skilled persons.
Select the correct answer from the codes given below :
(a) (B) and (C) (b) (B) and (D)
(c) (B), (C) and (D) (d) (A), (B) and (D)

19. The format of thesis writing is the same as in **[July-2016]**
(a) preparation of a research paper/article
(b) writing of seminar presentation
(c) a research dissertation
(d) presenting a workshop/conference paper

20. In a Ph.D. thesis which one is the correct sequence for showing scheme of Chapterisation? **[August-2016]**
(a) Survey of related studies, Introduction, Design of the study, Data-Analysis and interpretation, Conclusions and generalisations, suggested further study, References, Appendix
(b) Introduction, Design of study, Data Analysis and Interpretation, Generalizations, Conclusions and Survey of related studies and suggestions for further research, References and Appendix
(c) Introduction, Survey of related studies, Design of study, Datapresentation; Analysis & interpretation, Formulation of generalization & Conclusions, Suggestions for further research, References & Appendix
(d) Survey of related studies, References, Introduction, Design of study, Data analysis and interpretation, Conclusions and generalizations, Suggestions for further research, Appendix

21. A detailed description of methodology of research is required in **[August-2016]**
(a) Thesis/Dissertation
(b) Symposium/Workshop
(c) Seminar paper/Articles
(d) Conference and Seminar Papers

22. In which of the following, reporting format is formally prescribed ? **[January-2017]**
(a) Doctoral level thesis
(b) Conference of researchers
(c) Workshops and seminars
(d) Symposia

23. In finalizing a thesis writing format which of the following would form part of supplementary pages?**[November-2017]**
(a) List of tables and figures
(b) Table of contents
(c) Conclusions of the study
(d) Bibliography and Appendices

24. In which of the following arrangements a wider spectrum of ideas and issues may be made possible ? **[November-2017]**
(a) Research Article (b) Workshop mode
(c) Conference (d) Symposium

25. In which of the following activities, potential for nurturing creative and critical thinking is relatively greater ? **[July-2018]**
(a) Preparing research summary
(b) Presenting a seminar paper
(c) Participation in research conference
(d) Participation in a workshop

26. A research report will contain : **[December-2018]**
(A) Financial accounts (B) Prefatory parts
(C) Utilisation certificates (D) Title page
(E) Table of contents (F) Terminal chapters
Code :
(a) (B), (D), (E) and (F) (b) (A), (C), (D) and (E)
(c) (A), (B), (C) and (E) (d) (C), (D), (E) and (F)

27. Position papers are: **[20th June 2019-IInd Shift]**
(a) Compiling of academic articles.
(b) Providing review articles.
(c) Offering a synopsis of an extended research.
(d) Highlighting of issues and depiction of status.

28. Reference serves the purpose of **[21st June 2019-IInd Shift]**
(a) Lending authenticity to the given content
(b) Insightful decision making
(c) Giving ornamental value to the research
(d) Exhibiting the great achievement

29. Supervisor's certification on the thesis **[21st June 2019-IInd Shift]**
(a) Gives name and fame to the supervisor
(b) Clears different bottlenecks in the system
(c) Gives weightage to the scholar's work
(d) Ensures originality of the work

30. Bibliography given in a research report: **[24th June 2019-Ist Shift]**
(a) Helps those interested in further research.
(b) Shows the vast knowledge of the researcher.
(c) Makes the report authentic.
(d) Is an optional part of the report.

31. In a thesis 'Format and styles of referencing' have been inappropriately followed, this is an example of **[2nd Dec. 2019-Ist Shift]**
(a) Technical lapse on the part of researcher
(b) Unethical practice of the researcher
(c) Inability of the researcher to write a thesis
(d) Lack of commitment on the part of researcher to write a thesis

32. Arrange the steps of research in the sequence in which they are presented in the thesis **[4th Dec. 2019-IInd Shift]**
(a) Discussion, Review of Literature, Results, Conceptual Framework, Problem
(b) Review of Literature, Problem, Conceptual Framework, Result, Discussion
(c) Problem, Review of Literature, Conceptual Framework, Results, Discussion
(d) Problem, Review of Literature, Conceptual Framework, Results, Discussion

33. In which of the following formats, 'Research Abstract' is a must? **[3rd Dec. 2019-Ist Shift]**
(i) Research article (ii) Seminar paper presented
(iii) Thesis (iv) Research synopsis
Choose the most appropriate option from those given below:
(a) (i), (iii) and (iv) (b) (i), (ii) and (iv)
(c) (i), (ii) and (iii) (d) (ii), (iii) and (iv)

34. In which of the following formats 'Chapter Scheme' of the document has to be formally approved by a research degree committee in the university? **[4th Dec. 2019-Ist Shift]**
(a) Thesis/dissertation (b) Seminar papers
(c) Research articles (d) Research monographs

35. A research scholar while submitting his/her thesis did not acknowledge in the preface the help and support of the respondents of questionnaires used. This will be called an instance of **[4th Dec. 2019-Ist Shift]**
(a) Technical lapse (b) Wilful negligence
(c) Unethical act (d) Lack of respect

36. A workshop is meant for **[25th June 2019-IInd Shift]**
(a) Hands-on experience
(b) Listening to scholarly lectures
(c) Learning with interaction
(d) Discussing over one's own work

37. The style of writing a thesis and research article has to be **[3rd Dec. 2019-IInd Shift]**
(a) Creative in so far as diction is concerned
(b) Scientific in respect of language used
(c) Mechanical in so far as placement of figures and tables is concerned
(d) Variable in respect of referencing

HINTS & EXPLANATION

1. (c) Conference, Lecture as well as Seminar, provide a forum for researchers/scholars to present or share the papers/reports/articles on their chosen domain of knowledge or research. Workshop, on the other hand, offers hands on experience of doing or working on something. Since the issue here is of learning the use of SPSS, the college will have to organise a workshop.

2. (b) Bibliography, generally appearing at the end of the book or article, is a list of all the written sources used (whether referenced or not) in the process of the particular research. It generally includes the names of the works, their authors, their publisher and the location of the publisher. So, it helps those who are interested in further research.

3. (c) Primary data is direct or firsthand evidence collected from sources like an event, object, person, e.g., historical and legal documents, eyewitness accounts, results of experiments, statistical data, pieces of creative writing, audio and video recordings, speeches, and art objects using methods like surveys, interviews, or experiments.

Secondary data is data gathered from studies, surveys, or experiments that have been run by other people or for other research.

Researchers usually begin with secondary data as this allows time to formulate questions and gain an understanding of the issues at hand before collecting primary data which consumes much time and money.

4. (b) Workshop is a meeting at which a group of people engage in intensive discussion and activity on a particular subject or project. As a research methodology, Workshop emphasizes on "hands-on-practice" or laboratory work to reinforce, imprint and/or implement actual concepts or techniques to obtain the result. Seminar, symposium and conference involve formal meeting of experts to share their views and research only, without any hands on activity to prepare a result.

5. (d) Workshops are meant for hands on training/experience.

6. (a) ibid

Ibid, a Latin term which means, 'in the same place', is used in place of an endnote or footnote citation or reference from a source that was cited in the preceding endnote or footnote.

Example: 1. Max Weber, *Economy and Society*, Pg 201
2. Ibid.

This means that both notes refer to page 201 of Max Weber's *Economy and Society*.

et al., derived from the Latin phrase *et alia*, means 'and others'. It is mainly used for in-text citations of research papers having multiple authors.

Example:

Rasmussen, Hopkins, & Fitzpatrick, (2004).

The second time Rasmussen, Hopkins, and Fitzpatrick (2004) is used, the source is cited like this: Rasmussen et al. (2004)

Op. Cit., an abbreviation of the Latin phrase opere citato, meaning "in the work cited." It is used in an endnote or footnote to refer to a previously cited work, standing in for repetition of the full title of the work.

Example:

1. Y. Anzai and H. A. Simon. The theory of learning by doing. Psychological Review, 86, 124-180, 1979, p. 126
2. J. R. Anderson. Cognitive psychology and its implications, 2nd edn, Freeman, New York, 1985, p. 234
3. Anzai and Simon, op. cit., p. 157
4. Anderson, op. cit., p. 36

loc.cit., an abbreviation for the Latin Loco citato, means 'in the place cited'. It's use is similar to that of ibid., but it refers to the same place (like the same page or paragraph) in the same work just citied.

Example:

1. R. Millan, "Art of Latin grammar" (Academic, New York, 1997), p. 23.
2. Loc. cit.

7. (a) Sharma, V. (2010). Fundamentals of Computer Science. New Delhi : Tata McGraw Hill

The basic structure of book reference in APA style is as follows:

Author, A. A. (Year of publication). Title of work: Capital letter also for subtitle. Location (City, State): Publisher

8. (a) The impact factor (IF) of a research journal is a measure of the frequency with which the average article in it has been cited in a particular year, it ascertains the importance or rank of the journal. The IF is calculated by dividing the number of times its published articles were cited by the number of articles that were cited over a two-year period.

The h-index measures the impact of a particular researcher, rather than a journal, in terms of the number of their published papers and the number of times they have been cited in other publications. For a set of papers, ranked in decreasing order of the number of citations that they received, the h-index is the (unique) highest number of papers that received h or more citations.

The G-index is an improvement of the H-index for quantifying productivity based on publication record. It gives the highest number (g) of papers that together received g2 or more citations.

i-10 index refers to the number of papers with 10 or more citations.

9. (c) contains peer-reviewed original research or evaluation of research conducted by others.

A research paper is a dissertation with facts and figures published in a journal or read in a seminar. It is either an evaluation of some other research or based on the author's original research. It is not merely a compilation of information. A paper cannot be published in more than one journal.

10. (d) Hall, Donald. Fundamentals of Electronics.

New Delhi : Prentice Hall of India, 2005

The Modern Language Association (MLA) specifies a standard format for essays and research papers written in an academic setting: One-inch page margins; Double-spaced paragraphs.; A header with author's last name and page number one-half inch from the top of each page.

11. (d) a brief intensive course for a small group emphasizing the development of a skill or technique for solving a specific problem.

A Conference is extensive, spread over days and attended by a large group.

A meeting does not involve development of a skill or technique.

A class discussion is mainly theoretical and generally does not involve hands on skills.

12. (d) the text itself

13. (c) The thesis statement is a complete sentence stating the narrow, purposeful, and specific main point or idea of the research paper clearly identifiable within the paper. It is not an established fact, nor a discussion or observation.

14. (d) The core elements of a dissertation are—Introduction; Literature Review; Research Methodology; Results; Discussion and Conclusion.

15. (b) A seminar brings together small academic groups for presentations on a set of topics in recurring meetings, conducted monthly or even weekly, focusing each time on some particular topic.

A workshop is a series of educational and work sessions on a defined area of concern by small groups of people emphasizing on "hands-on practice" or laboratory work.

Symposium: A Symposium is a formal academic gathering of experts in their fields who present or deliver their opinions or viewpoints on a single chosen topic of discussion in a single day.

Training program: The Research Training Programme (RTP) consists of training modules on research methods, theories and philosophies, thesis writing and other generic skills relevant to PhD study.

16. (a) (A), (B), (C) and (D)

Characteristics of a well-written thesis:

- A clear title and abstract which accurately and succinctly reflect the nature of the research study.
- A structure and format which help the reader to absorb the subject matter.
- An intellectual coherence which starts with precise aims, from which follow the research design, and a clear conclusion.
- Accuracy in grammar and punctuation.
- Consistency in referencing presentation and the use of terms.

17. (b) (B), (C) and (D)

The basic rules of APA style referencing are:

- All entries in alphabetical order by the first word of the entry
- The reference section is double-spaced.
- Indent after the first line of each entry
- Entries are not numbered
- If no author is listed, begin entry with title
- Invert author's name: last name followed by first and middle initials
- Titles of books, journals, magazines, and newspapers in italics.
- List up to seven (7) authors.
- In case of eight (8) or more authors, use only the first six (6) and then ellipses (...) ending with the last author.
- Capitalize ONLY the first word of a title, the first word of a subtitle, and proper nouns in titles of books and articles
- Give dates in Year, Month, Day format (e.g. 1999, December 20) in parenthesis after the author's name (or title if no author is listed)

18. (d) (A), (B) and (D)

A seminar is a form of academic instruction which brings together small groups for recurring meetings, focusing each time on some particular subject, in which everyone present is requested to participate. This is often accomplished through an ongoing Socratic dialogue with a seminar leader or instructor, or through a more formal presentation of research. It is essentially a place where assigned readings are discussed, questions can be raised and debates can be conducted.

19. (c) The format of thesis writing is the same as in a research dissertation.

20. (c) Introduction, Survey of related studies, Design of study, Data presentation; Analysis & Interpretation, Formulation of generalization & conclusions, Suggestions for further research, References & Appendix

21. (a) Symposium, Workshop, Article, Conference or Seminar Papers do not require detailed description of the methodology of research. They are written documents in around 10 pages meant for oral presentation requiring 15-20 minutes at the most. Thesis is commonly written in more than 20000 words.

22. (a) Conferences, workshops, seminars and symposia are forums for researchers to discuss their work. A doctoral thesis, on the other hand, is a written document of a research meant for publication, and hence, is to be written in the prescribed format.

23. (d) Table of contents gives an outline of the thesis and precedes the chapters of the thesis. Conclusions a well as List of tables and figures refer to the main content of the thesis/ dissertation. Bibliography –which lists the references— as well as appendices— which provide matter missed out in the thesis—supplement the thesis.

24. (c) A research article is a report of a research study conducted by the author(s) through a specific research method, identifying a research population. It is generally published in a peer-reviewed journal and asks a research question or states a hypothesis or hypotheses. A workshop is a meeting at which a group of people engage in intensive discussion and activity on a particular subject or project. A symposium is a forum for researchers to present and discuss their work in a specific field. Conference is similar to a symposium but involves greater participation and is spread over several days. So a wider spectrum of ideas and issues is made possible in a spectrum.

25. (d) Participation in a workshop

Preparing a research summary is an exercise in recording the research process in detail. Presenting a seminar paper encompasses reading out of the text of documented research. Participation in research conference again relates to recounting of a research project, either completed or in the process, in an interaction with others in the same field. Participation in a workshop, however, entails intensive discussion pertaining to research projects in a particular field and hence, is the breeding ground for creative and critical thinking.

26. (a) (B), (D), (E) and (F)

A research report contains

Title page; Prefatory Parts (Cover; Letters of authorization, acceptance); Table of contents; Synopsis; Introduction; Body; Terminal chapters (Summary; Conclusions); Supplementary Parts (Appendices, Bibliography)

27. (d) a report

A position paper is a detailed written report from an organization or government which outlines its position/ attitude/ intention regarding a particular issue; or, explains/justifies/ recommends some particular policy or course of action it proposes.

28. (a) Reference serves the valuable purpose of lending authenticity to the given content. Reference proves that the cited ideas, words or research of other writers support the assertions and claims in the work in question.

29. (d) The research supervisor, who is an academic involved in post doctoral work, extends research guidance to the researcher throughout the process of the research from the formulation stage to presentation/publication of the research report/thesis, ensuring that the work meets the academic standards of the discipline. The thesis must bear the certification from the supervisor that the research has been carried out under his/her supervision and is an **original** work.

30. (a) A bibliography is a list of all of the resources the researcher has used in the process of researching. It is standard practice in scholarly writing to include at the end of research report a list of the sources that the researcher/writer consulted or cited. It helps readers in further reading and research.

31. (a) Referencing is giving credit, with citation, to the source of information used in one's work. It is done at the end of a thesis in a particular format and style. If it is done inappropriately, it is a technical lapse on the part of the researcher. It however, doesn't undermine the researcher's competency in writing a thesis, nor does it point to lack of commitment. It certainly does not violate ethical concerns.

32. (c) The steps of research as presented in the thesis are: the Research Problem which the research study proposes to solve; Review of Literature studied on the subject of research, Conceptual Framework of the research process including data collection and analysis, the Results obtained, and finally the Discussion on the findings.

33. (c) An abstract is a short summary of a research paper/ thesis placed before the main document to serve multiple purposes:

- Gives readers the gist or essence of the paper/ article (with all the major elements of the work in a highly condensed form) which generates interest to read the full paper;
- Prepares readers to follow the detailed information, analyses, and arguments in the full paper;
- Helps readers remember key points from the paper.

An abstract is a regular feature in a research article/ paper (6-7 sentences, 150-250 words long) and a thesis/dissertation (1-2 pages long).

34. (a) Thesis/Dissertation is an extended document, embodying results of original research and substantiating the specific view of a candidate who presents it for an academic degree. The candidate needs to present to the research degree committee in the university for their formal approval the proposal of the research complete with the Title and Chapter Scheme of the Thesis/Dissertation to be written. Seminar papers are presented to a gathering of researchers, scholars and academics; research articles are published in academic journals; and, research monographs are straightforward and concise research papers with less details on a specific subject or addressing a single identified research problem.

35. (c) The preface of a thesis includes the researcher's experiences during the study and the writing of the report. It also thanks people who have helped with the thesis including the respondents of questionnaires. Not acknowledging the help and support of the respondents is an unethical act, as the report would not have taken shape without their contribution.

Technical lapse is straying from the standard, accepted norms or formats. Wilful negligence is ignoring or not acknowledging something on purpose. Lack of respect is not relevant here.

36. (a) A workshop is an interactive session, often taking a full day or more, in which clients, researchers and/or other participants such as customers work intensively on an issue or question, engaging in research, brainstorming and problem solving. So, it offers hands on experience.

37. (b) The style of thesis writing, regardless of the subject domain being science or any other, must be scientific in respect of language used. Scientific writing is technical writing that researchers do to communicate their findings and analysis to others. Scientific writing is predicated on the rigors of scientific inquiry, so it must reflect the same precision as that demanded in the research process.

CHAPTER 11

Application of ICT in Research

APPLICATION OF ICT IN RESEARCH

Academic publishing

It has taken on a new dimension with the advent of Information and Communication Technology (ICT). The processes as well as products/fruits of academic research and scholarship now enjoy a worldwide reach/connectivity and easy availability of resources in the electronic format. Academic/Research work, usually published in the form of academic journal article, book or thesis/dissertation, has grown manifold with e-publishing on the worldwide web. Most established academic outfits have their own journals and other publication, and publish work from several distinct/specialized fields or subfields. **Literature Search, Content Search, Literature Tracking** has become a cakewalk with the exhaustive repository of academic output made available on the worldwide web.

Academic materials and research output, not formally published by academic concerns and distribution channels but merely printed up or posted on the Internet by others is termed **grey literature.**

Quantitative/Qualitative Data Collection

Data collection and monitoring and evaluation (M&E) efforts take a great deal of time and methodical planning and implementation. Traditionally performed with paper and pen, these tasks were prone to error, difficult to conduct on a large scale, and high in transaction costs. Information and communication technology (ICT) tools, including hardware like mobile phones and tablets, applications with the capacity to create digital surveys, and software that allows users to upload data to storage facilities in real-time, have reduced the conventional challenges associated with remote data collection and M&E. Surveys, Interviews, and Questionnaires can easily and speedily be carried out online using ICT applications.

Big Data Analytics

The vast repository of data is generated from modern information systems and digital technologies such as Internet of Things and cloud computing applied in several research disciplines like agriculture, healthcare and manufacturing. Analysis of these massive data requires huge efforts at multiple levels to extract knowledge for decision making. Big data analytics refers to the complex process of analysing such large and varied data sets, or big data, to unearth variable patterns, correlations, trends, etc., that can help researchers to make inferences, arrive at conclusions and make informed decisions. ICT applications enable big data analytics.

Peer Review

Most scientific and scholarly journals, and quite a few academic and scholarly books, go through a **peer review** or refereeing by experts in the concerned field to certify their quality before publication. ICT has sped up this process considerably by eliminating the logistic hassles like postal delays.

RESEARCH PUBLICATIONS' AVAILABILITY ON THE WORLDWIDEWEB

The early 1990s, saw the beginning of licensing of electronic resources, particularly journals. And soon, **open access** via the Internet, became an important trend, particularly with respect to journals in the sciences. In open access publishing, the publisher makes a journal article available on the worldwide web for free. Authors may also avail themselves of open access self-archiving by making a copy of their published articles available on the web.

Thanks to ICT, every academic/research organization, university, library, etc., today houses its repository of thesis/dissertation on its official portal and makes it available to all for free or sometimes, for a fee. Many online publishing organizations through their public portals provide authors around the world a global platform to showcase their valuable research work.

INFLIBNET

Information and Library Network (INFLIBNET) Centre is an autonomous Inter-University Centre (IUC) of the University Grants Commission (UGC) of India headquartered at Gujarat University Campus, Ahmedabad.

In April 1988, the University Grant Commission (UGC) constituted a committee under the chairmanship of Prof. Yash Pal, to work out the details of a university information library networking system. The report of this working group was published in December 1988 containing a project proposal for the establishment and development of an information and library network. Finally, in April 1991, INFLIBNET was initiated by the UGC.

Started as a project under the IUCAA, it became an independent Inter-University Centre in June 1996. INFLIBNET is a computer communication network of libraries and information centres of universities, institutions of national importance, Research and Development Institutions, bibliographical information centres, etc. It uses state-of-the-art technologies for optimising the capability in information handling and service and creating the infrastructure for the sharing of library and information resources and services among the academic and research institutions. INFLIBNET is set out to be a major player in promoting scholarly communication among academicians and researchers in India.

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The main **resources** of INFLIBNET are:

(i) University catalogue of documents/periodicals/theses

(ii) Research & Development Library Catalogue of the collection of NISCAIR and NASSDOC.

(iii) The computerized catalogue of the National Library of Kolkata.

(iv) Indigenous Databases of discipline oriented information centres such as Machine tools, Food technology, Leather technology, Drugs, Aeronautics

The main **functions/activities** of INFLIBNET are:

(i) INFLIBNET is a cooperative venture; its resources depend on the users/participants. The development of SOUL

(ii) The INFLIBNET Library plays a vital role in the collection development and dissemination of scientific and technical information to meet the present and future needs of the government.

(iii) The introduction of library management software, SOUL is likely to give more revenue to INFLIBNET and provide justification for more and more libraries to join it. Under Prime Minister's special package to NE India, SOUL packages are given free of cost to those libraries which are under 2F or 12B of UGC. Delivery of SOUL package is done through the UGC Regional office. The SOUL 2.0 was launched in 2009.

(iv) INFLIBNET Centre develops a digital institutional repository using DSpace software. It hosts INFLIBNET's Press and Media related documents, INFLIBNET's Annual Reports, INFLIBNET's Convention Proceedings, INFLIBNET's Special Seminar, etc.

(iii) It takes an active role in Electronic Submission of Theses and Dissertations (ETD), a joint venture with UGC, making it mandatory to submit the electronic copy of a thesis whenever the research scholars submit their thesis to the respective university or institutions for the PhD degree.

(iv) It launched an open source utility primarily focused on libraries, where one needs to convert CCF data to MARC21 format.

(v) It has standardized MARC – II as bibliographic standard for data capturing.

(vi) It holds Seminars, Conferences, Workshops and Training. It conducted Convention on Automation of Libraries in Education and Research Institutions (CALIBER) and Promotion of Library Automation and Networking in North Eastern Region (PLANNER) annually; and 2009 onwards, it has been conducting it every alternate year. It also conducts INFLIBNET Regional Training Programme on Library Automation (IRTPLA) and Attachment Training Programme for Practicing Librarians and Computer Professionals of North Eastern Region.

(vii) It maintains four online mailing lists besides its "INFLIBNET Centre Blog" <http://www.inflibnet.ac.in/blog/> that provides news and announcement related to the INFLIBNET.

e-consortium of INFILIBNET

e-ShodhSindhu is a Consortium for Higher Education Electronic Resources that provides access to e-resources to Universities, Colleges and Centrally Funded Technical Institutions in INDIA. It is an Initiative by MHRD, Govt of India being Executed by INFLIBNET Centre.

Shodh Suddhi is a programme introduced by MHRD, Govt of India on the recommendation of Sub-Committee, National Steering Committee (NSC) of eShodh Sindhu. It provides access to Plagiarism Detection Software (PDS) to all universities/ Institutions in India since Sept 1, 2019.

N-list or National Library and Information Services Infrastructure for Scholarly Content is an Initiative of Ministry of Human Resource Development (MHRD) under the National Mission on Education through ICT (NME-ICT) now funded by UGC. The consortium subscribes to all the major e-journal and e-book across the world resources for the use of students, researchers and faculty from colleges and other beneficiary institutions through server(s) installed at the INFLIBNET Centre colleges. It is the college component of eShodh Sindhu.

Open-access initiatives of INFLIBNET

Shodhganga is a digital reservoir of all Indian theses. The UGC Notification (Minimum Standards & Procedure for Award of M.Phil. / Ph.D Degree, Regulation, 2016) dated 5th May 2016 mandates submission of electronic version of theses and dissertations by the researchers in universities with an aim to facilitate open access to Indian theses and dissertations to the academic community world-wide. Online availability of electronic theses through centrally-maintained digital repositories, not only ensures easy access and archiving of Indian doctoral theses but also aims to help in raising the standard and quality of research; and overcome the serious problem of duplication and/ or poor quality of research resulting from the "poor visibility" of research output.

Shodhgangotri is the repository of Indian Research in Progress details (Synopses/Research Proposals for PhD programme).

IR@INFLIBNET is the Institutional repository of INFLIBNET Centre housing articles published in all conventional proceedings of INFLIBNET Centre, training material, press clippings, newsletters, etc.

Vidya-mitra is an online learning portal for all the e-content projects developed under the NME-ICT (National Mission on Education through Information and Communication Technology), MHRD. The portal provides facility to search and browse all hosted content wherein a learner can easily access the desired material including audio/video learning material, textual material, multimedia-enriched materials etc. through a single interface. Moreover, features of faceted search, usage statistics, project-wise access, My-Space are incorporated in this portal.

Vidwan is the premier database of profiles of scientists / researchers and other faculty members working at leading academic institutions and other R & D organisation involved in teaching and research in India. It provides important information about expert's background, contact address, experience, scholarly publications, skills and accomplishments, researcher identity, etc. The database is developed and maintained by INFLIBNET with financial support from the National Mission on Education through ICT (NME-ICT). The database is instrumental in selection of

panels of experts for various committees, taskforce, established by the Ministries / Govt. establishments for monitoring and evaluation purposes.

IndCat is a free online Union Catalogue of Books, Theses and Serials of major university/institute libraries in India. It contains bibliographic information, location and holdings of Books, Theses and Serials. It provides the records in standard bibliographic formats, i.e., MARC, MARCXML. It covers all major subjects, i.e. Psychology, Statistics, Political Science, Economics, Law, Public Administration, Education, Commerce, Linguistics, Mathematics, Astronomy, Physics, Chemistry, Biology, Life Sciences, Botany, Zoology, Medicine, Engineering, Agriculture, Management, Architecture, Sports, Literature, History, Computer Science etc. A Web-based interface is designed to provide easy access to the merged catalogues. The IndCat is a major source of bibliographic information that can be used for Inter-Library Loan, Collections Development as well as for Copy Cataloguing and Retro-Conversion of bibliographic records.

GOVERNMENT SPONSORING OF RESEARCH

The Prime Minister's Research Fellowship (PMRF) scheme is aimed at attracting the talent pool of the country to doctoral (Ph.D.) programmes of Indian Institute of Science (IISc), Indian Institutes of Science Education & Research (IISERs), Indian Institutes of Technology (IITs) and Central Universities (which are among the top 100 National Institutional Ranking Framework, NIRF ranked universities) for carrying out research in cutting edge science and technology domains, with focus on national priorities.

Central Government runs various scholarships and funding schemes for Research & Development and innovation in the following Departments and Agencies:

(i) All India Council for Technical Education (AICTE)
(ii) Department of science and Technology
(iii) Council of Scientific and Industrial Research (CSIR)
(iv) Defence Research and Development Organisation (DRDO)
(v) Department of Atomic Energy (DAE)
(vi) Department of Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homoepathy (AYUSH)
(vii) Department of Biotechnology (DBT)
(viii) Ministry of Coal (MOC)
(ix) Ministry of Earth Sciences (MoES)
(x) Department of Scientific and Industrial Research (DSIR)
(xi) Indian Council of Medical Research (ICMR)
(xii) India Meteorological Department (IMD)
(xiii) Indian Space Research Organisation (ISRO)Indian Space Research Organisation (ISRO)
(xiv) Department of Electronics & Information Technology (DeitY)
(xv) Ministry of Environment, Forest and Climate Change
(xvi) Ministry of New and Renewable Energy
(xvii) Ministry of Power
(xviii) Ministry of Social Justice & Empowerment (MOSJE)
(xix) Ministry of Water Resources, River Development & Ganga Rejuvenation
(xx) Ministry of Petroleum & Natural Gas
(xxi) University Grants Commission (UGC)

EXERCISE

1. Information and Communication Technology includes: **[December-2006]**
(a) On line learning
(b) Learning through the use of EDUSAT
(c) Web Based Learning
(d) All the above

2. The process of laying out a document with text, graphics, headlines and photographs is involved in **[June-2007]**
(a) Deck Top Publishing
(b) Desk Top Printing
(c) Desk Top Publishing
(d) Deck Top Printing

3. ERIC, MEDLINE and ABI/INFORM are instances of **[26th June 2019-II Shift]**
(a) Citation services
(b) Electronic databases
(c) Printed databases
(d) Libraries

4. Which of the following provides the overarching vision that guides research into socially relevant areas? **[3rd Dec. 2019-I Shift]**
(a) ARILA
(b) IMPRINT
(c) NIRF
(d) SWAYAM PRABHA

5. Which of the following is a programming language? **[2nd Dec. 2019-II Shift]**
(a) Deep learning
(b) Machine learning
(c) Artificial Intelligence
(d) Python

6. Which of the following is most suitable for being designated as Fourth Generation Language (4GL)? **[3rd Dec. 2019-I Shift]**
(a) ALGOL (b) Java
(c) C (d) SQL

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7. The application of which of the following ICT in research will ensure wider coverage and accessibility of needed information ? **[3rd Dec. 2019-IInd Shift]**
(a) LAN (b) WAN
(c) Skype (d) Intranet

8. A researcher intends to make use of ICT in his/her research. What considerations should weigh most in such a decision? **[4th Dec. 2019-Ist Shift]**
(A) Appropriateness of the tool used
(B) Cost involved in procuring it
(C) Availability of tools in the department where research is to be undertaken
(D) Willingness of his/her supervisor to offer help
(E) The company from which the ICT equipment has been procured
Choose your answer from the following options:
(a) (A), (B) and (C) (b) (C), (D) and (C)
(c) (A), (C) and (D) (d) (B), (C) and (E)

HINTS & EXPLANATION

1. (d) Information and communication technology (ICT) is an extensional term for information technology (IT) that includes on line learning, learning through the use of EDUSAT and Web Based Learning.

2. (c) The process of laying out a document with text, graphics, headlines and photographs is involved in Desk Top Publishing. DTP uses specialized software and high resolution printer(s) to assemble, design, and produce commercial quality printed material.

3. (b) Electronic databases are searchable electronic collections of resources. There are two basic types of databases: Indexes or bibliographic databases; and Full-text databases.
ERIC(Education Resources Information Center) is an online library of education research and information; MEDLINE® contains journal citations and abstracts for biomedical literature from around the world; and ABI/INFORM™ contains thousands of full-text journals, dissertations, working papers, key business and economics periodicals such as the Economist, country-and industry-focused reports, and downloadable data which gives researchers a complete picture of companies and business trends around the world.

4. (b) *Impacting Research Innovation and Technology (IMPRINT)* is the first of its kind MHRD supported Pan-IIT + IISc joint initiative to address the major science and engineering challenges that India must address and champion to enable, empower and embolden the nation for inclusive growth and self-reliance. IMPRINT provides the overarching vision that guides research into areas that are predominantly socially relevant.

5. (d) *Python* is an interpreted, high-level, general-purpose programming language, created by Guido van Rossum and was first released in 1991. Python language is being used by almost all tech-giant companies like – Google, Amazon, Facebook, Instagram, Dropbox, Uber etc.

6. (d) A fourth generation (programming) language (4GL) is a grouping of programming languages that attempt to get closer than 3GLs to human language, form of thinking and conceptualization. Fourth generation languages are commonly used in database programming and scripts examples include Perl, PHP, Python, Ruby, and SQL. Structured Query Language (SQL) is a standard computer language for relational database management and data manipulation. SQL is used to query, insert, update and modify data.

7. (b) WAN or wide area network is a geographically distributed private telecommunications network that interconnects multiple local area networks (LANs) of computers.

8. (a) The following considerations would weigh in the researcher's decision if ICT is to be used.
- Appropriateness of the tool used
- Cost involved in procuring it
- Availability of tools in the department where research is to be undertaken

The company of the ICT tool is immaterial as long as the tool is suitable for the researcher's requirement. The supervisor is entitled to help with the research subject/ topic and thesis rather than the tool which the researcher chooses to use.

CHAPTER 12

Research Ethics

RESEARCH ETHICS

Research Ethics has three major concerns:

(i) to protect human participants from harm;

(ii) to ensure that the research process serves the interests of individuals, groups and/or society as a whole; and

(iii) to examine specific research activities and projects for their ethical soundness in terms of management of risk, protection of confidentiality and the process of informed consent.

Research ethics are based on three fundamental principles:

1. **Respect for Persons:** (i) People should be treated as autonomous which means researchers must respect that individuals should make their own informed decisions about whether to participate in research. (ii) People with diminished autonomy should be protected, which means those like young children or the infirm and/or invalid, who may not be capable of making fully informed decisions on their own about how to act or what to receive should be protected and only be included in research under specific circumstances.
2. **Beneficence:** (i) No harm should be caused, which means the purpose of research should never be to hurt anyone or to extract information at the expense of other people.

   (ii) Benefits for participants should be maximized and risks to participants, minimized.
3. **Justice:** Fairness and equitability should be ensured in terms of (i) recruitment of participants (ii)choice of location to conduct the study (iii) questions asked being relevant to the participating communities.

ETHICAL ISSUES PERTAINING TO THE RESEARCH PROCESS

1. **Bias** or lopsided presentation of facts/truth; it undermines objectivity.
2. **Inappropriate research methodology** or biased sample, method and procedure; it distorts findings
3. **Falsification** or inaccurate representation of research process, instrument, data and findings
4. **Fabrication** or creating spurious data without actual test/ survey
5. **Incorrect reporting** or manipulating results
6. **Authorship impropriety** in terms of improper assignment of credit (including/excluding author/s at will) or submission of multi-authored paper without knowledge of all the authors
7. **Duplicacy** or submitting same study in more than one journal
8. **Partial publication** or publishing parts of same study in different journals
9. **Peer review impropriety** or compromising confidentiality and protection of intellectual property in a peer review by revealing identities/names of reviewer/author (both should be unaware of each other's names in a Peer review)
10. **Plagiarism** or appropriating someone else's ideas, materials, products as one's own; plagiarism can be *Intra-corpal* (one copying from another in the same submission; *extra-corpal* (copying from an external source like book, journal, internet); or *autoplagiarism* (citing one's own work without reference/acknowledgement)
11. **Compromising reliability & validity of research** by using faulty measuring instrument that doesn't measure what it is intended to measure.

MEASURES TO ENSURE ETHICAL RESEARCH

1. Following professional code of ethics to maintain professional standards and to be accountable and responsible
2. Following state and Central Government regulations that enable protection and advancement of individuals as well as society
3. Seeking informed consent and voluntary participation
4. Screening to select participants tolerant to risks involved
5. Carrying out pilot studies with follow-up diagnostic as a precautionary measure against potential harm
6. Preparing protective research design to estimate probability, severity and duration of risk/harm
7. Taking outside review of research proposal to minimize risk
8. Allowing participants withdrawal from study at any stage of research
9. Maintaining honesty and integrity in every aspect of research
10. Exercising extreme care to avoid errors and discrimination

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EXERCISE

1. Research is not considered ethical if it **[December-2011]**
(a) tries to prove a particular point.
(b) does not ensure privacy and anonymity of the respondent.
(c) does not investigate the data scientifically.
(d) is not of a very high standard.

2. Research ethics do not include **[June-2012]**
(a) Honesty (b) Subjectivity
(c) Integrity (d) Objectivity

3. Good 'research ethics' means **[December-2012]**
(a) Not disclosing the holdings of shares/stocks in a company that sponsors your research
(b) Assigning a particular research problem to one Ph.D./ research student only
(c) Discussing with your colleagues confidential data from a research paper that you are reviewing for an academic journal
(d) Submitting the same research manuscript for publishing in more than one journal

4. Which one of the following belongs to the category of good research ethics? **[June-2013]**
(a) Publishing the same paper in two research journals without telling the editors.
(b) Conducting a review of the literature that acknowledges the contributions of other people in the relevant field or relevant prior work.
(c) Trimming outliers from a data set without discussing your reasons in a research paper.
(d) Including a colleague as an author on a research paper in return for a favour even though the colleague did not make a serious contribution to the paper.

5. Ethical norms in research do not involve guidelines for : **[December-2015]**
(a) Thesis format (b) Copyright
(c) Patenting policy (d) Data sharing policies

6. From the following list of statements identify the set which has negative implications for 'research ethics' :**[July-2016]**
(i) A researcher critically looks at the findings of another research.
(ii) Related studies are cited without proper references,
(iii) Research findings are made the basis for policy making.
(iv) Conduct of practitioner is screened in terms of reported research evidences.
(v) A research study is replicated with a view to verify the evidences from other researches.
(vi) Both policy making and policy implementing processes are regulated in terms of preliminary studies.
Codes:
(a) (i), (ii) and (iii) (b) (ii), (iii) and (iv)
(c) (ii), (iv) and (vi) (d) (i), (iii) and (v)

7. Research ethics has a direct connection more often with which stages of research? **[August-2016]**
(a) Defining and delimiting the scope of research.
(b) Problem formulation and reporting of research findings.
(c) Defining the population and deciding the sampling technique for research.
(d) Deciding about statistical techniques and data analysis.

8. The issue of 'research ethics' may be considered pertinent at which stage of research ? **[January-2017]**
(a) At the stage of problem formulation and its definition
(b) At the stage of defining the population of research
(c) At the stage of data collection and interpretation
(d) At the stage of reporting the findings.

9. Which of the following is susceptible to the issue of research ethics ? **[November-2017]**
(a) Inaccurate application of statistical techniques
(b) Faulty research design
(c) Choice of sampling techniques
(d) Reporting of research finding

10. The problem of 'research ethics' is concerned with which aspect of research activities ? **[July-2018]**
(a) Following the prescribed format of a thesis
(b) Data analysis through qualitative or quantitative techniques
(c) Defining the population of research
(d) Evidence based research reporting

11. Plagiarism in research is: **[21st June 2019-Ist Shift]**
(a) Creative use of previous data.
(b) Copying unscrupulously and making use of it.
(c) Quoting someone and citing him/her.
(d) Referring to previous data and working over it with new objectives.

12. Which of the following is a plagiarism checking website? **[24th June 2019-Ist Shift]**
(a) http://go.turnitin.com
(b) http://www.researchgate.com
(c) http://www.editorial.elsevier.com
(d) http://www.grammarly.com

13. Which two among the following factors are responsible for transgression of ethical principle in research? **[5th Dec. 2019-Ist Shift]**
(A) Harm to the participants
(B) Lack of informed consent
(C) Not greeting the participants after the experiment is over
(D) Asking difficult questions
Choose the correct option:
(a) (A) and (C) only (b) (B) and (C) only
(c) (A) and (D) only (d) (A) and (B) only

14. A researcher while reporting his /her research findings gives weightage to stakeholder's perspective in a qualitative research theme. This will involve **[3rd Dec. 2019-IInd Shift]**
(a) Violation of ethical norms
(b) Bias and prejudices
(c) Disclosure of reality situation
(d) Inappropriate interference of others in research

15. A research scholar while formally reporting the research results in the form of a thesis acknowledges the support of his/her supervisor in the preface. This will be treated as a

[6th Dec. 2019_Ist Shift]

(a) Sheer formality (b) Needed formality
(c) Superfluous act (d) Part of ethicality

16. A college teacher presents a research paper in a seminar. The research paper cites references which are pretty old. This situation will be described as the case of

[6th Dec. 2019-IInd Shift]

(a) Technical lapse
(b) Ethical lapse
(c) Academic ignorance
(d) Inability of updating research source

17. The issue of research ethics becomes relevant in which of the following stages of research?

[2nd Dec. 2019 (Second Shift)]

(a) Problem selection
(b) Hypothesis formulation
(c) Hypothesis testing
(d) Data analysis and interpretation
(e) Defining of research population

Choose correct answer from the options given below:

(a) (a) and (b) (b) (c) and (d)
(c) (b) and (e) (d) (c) and (e)

HINTS & EXPLANATION

1. (b) Research is unethical if it does not ensure privacy and anonymity of the respondent.

Research ethics encompasses that respondents' privacy must not be compromised. The very purpose of research is to prove the hypothesis; not all research is done scientifically; and, rating a research high or low is the prerogative of the examiners, rather than an ethical concern.

2. (b) Research ethics does not include Subjectivity.

Ethics pertain to moral principles that govern a person's conduct in work relations. Research involving human subjects/participants invariably raises inter alia certain ethical issues. Honesty and integrity are universal ethical traits. In addition, a researcher must be objective (not influenced by personal feelings or opinions in considering and representing facts)rather than subjective (influenced by personal feelings, tastes, or opinions).

3. (b) Assigning a particular research problem to one Ph.D./ research student only 'is good research ethics',.

Research ethics comprise no discussion of any confidential data with a third party; disclosure of all interests that could potentially influence the work; mandatory declaration of funding source; prohibition of any monetary dealing between the researcher and the company under study; no simultaneous or concurrent submission, etc.

4. (b) Conducting a review of the literature that acknowledges the contributions of other people in the relevant field or relevant prior work 'is good research ethics'.

Research involving human participants raises unique and complex ethical, legal, social and political issues. Research ethics is specifically interested in the analysis of ethical issues that are raised when people are involved as participants in research.

It is an ethical practice to acknowledge the contribution of other relevant research work done in the field.

5. (a) Ethical issues related to patents are relevant to particular research groups that develop technology which may be relevant for patent applications.

Sharing research data by depositing it in connection with a published article or otherwise making data publicly available sometimes raises intellectual property questions.

While 'facts' cannot be copyrighted, most source materials used by historians are original works in their own right and, unless old enough to have entered the public domain, are likely to be covered by copyright law. Copyright does not merely apply to printed or formally published works: it includes, for example, manuscripts, letters, and recordings of interviews.

6. (c) The following statements have negative implications for 'research ethics':

- Related studies are cited without proper references
- Conduct of practitioner is screened in terms of reported research evidences
- Both policy making and policy implementing processes are regulated in terms of preliminary studies.

7. (b) Problem formulation and reporting of research findings

The researcher has freedom to decide on the scope of the research, the selection of population, sampling techniques, statistical techniques and data analysis. However, research ethics specifies that informed consent of the participating population is mandatory while formulating the research problem; and, regarding the data/information to be declared while reporting the research findings.

GP_4358

8. (c) At the stage of data collection and interpretation
Research ethics requires researchers to ensure the willingness, informed consent and confidentiality of participants or research population. At the stage of data collection and interpretation, it is imperative to ensure the willingness and informed consent of the research population.

9. (d) Research ethics has the following components:
- Voluntary participation of research population
- Informed consent of participants
- Researchers must maintain confidentiality of participants

Inaccuracies in terms of research design, statistical and sampling techniques are not susceptible to any of these.

10. (d) Evidence based research reporting
Research ethics is concerned with authentic and substantiated reporting of the procedure followed and data collected.

11. (b) Plagiarism refers to the unscrupulous practice of taking/ using someone else's work or ideas and passing them off as one's own

12. (a) The other websites are for research sharing (b); manuscript submission for editorial services (c); and grammar checking, etc.(d)

13. (d) (A) and (B) only.
The five ethical principles of research are as follows:
Harm to the participants
Lack of informed consent
Protecting anonymity and confidentiality
Avoiding deceptive practices
Providing the right to withdraw

14. (c) Since the research is qualitative, it is clear that perspectives of various stakeholders will be included. So, the event of the researcher giving weightage to their perspective is nothing but disclosure of the reality or the real situation; rather than bias/prejudice, violation of ethical norms, or inappropriate interference of others.

15. (d) Acknowledging the help, support and guidance availed in course of completing a research study is not just formality, nor a required formal process nor a superfluous act. It is part of ethicality involved in the research process. Research ethics are the moral principles that a researcher must follow in every way in every aspect of the research undertaken. Following ethical principles is indeed crucial for maintaining research integrity.

16. (d) Research studies are meant not only to answer research questions but also stand as reference/guidance for further research in the same or related area (s). A researcher must be able to produce results which are contemporary and relevant. For this, it is imperative to use updated data and resources. By citing old references, the academic/ scholar/researcher shows that they have not cared to update the materials/ resources used for their research study and thereby, has committed the serious lapse of carelessness which will undermine the relevance of the study.

Technical lapse refers to the lapse relates particular subject, art, or craft, or its techniques.

Ethical lapse relates to compromise with the moral aspects involved.

Academic ignorance means lack of knowledge about education and/or scholarship.

17. (b) Problem selection and hypothesis formulation are done by the researcher keeping in mind their interest, availability of resources, and relevance to the existing body of knowledge. There is no ethical concern involved at these stages. However, during hypothesis testing, data analysis and interpretation, data collected from the respondents are used and this throws the ethical concerns about their privacy, confidentiality, etc.

CHAPTER 13

Comprehension

Things to Bear in Mind/Strategies to Employ

- Most of the exams these days are conducted online; so, you need to have ample RCs practice on computer to pass this section with fly0.ing colours. While attempting RCs online, you can't underline important points or mark different areas in the passage and therefore, you need to hone your skills by practising regularly.
- Quickly skim through the passage before you read the passage thoroughly or attempt the questions.
- Before you start reading the passage, go through the questions that need to be answered. This will give you a fair idea about what the passage talks about. Once you start reading the passage, you can start locating the answers to questions.
- It is very important to make inferences while reading the passage because most of the questions are not asked directly. Your understanding of the passage and its theme is of utmost importance as it helps you eliminate the wrong options and pick the right one.
- Before reading the entire passage, first, read the first and last paragraph of the RC to have an idea what the author is saying in the paragraph. This will help you in having an overview of the whole passage.
- When you are attempting a question based on phrase, just read the two-three lines above and below that phrase to have an idea what is implicit from that phrase.
- If there are questions on vocabulary then you should attempt them first as it is quite easy to pick the antonyms and synonyms. You don't have to answer the questions in the order they appear to you because in the exams, you can skip the questions and move to the next one and again come back to the previous ones as per your choice.
- In most of the cases, elimination of choices works better than selection of choices. You should try to eliminate those options which are broad, narrow, odd and irrelevant to the question asked. This strategy will help you reach the correct choice easily along with high accuracy.
- Mark the answers only if you are sure of it and make sure you don't go for wild guess.
- Never use your past knowledge about the topic to answer any question.
- Read articles in newspapers on regular basis to improve your reading speed and vocabulary.

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EXERCISE

PASSAGE - 1

Each day at the Shantiniketan School starts with the Saraswati Vandana. When painting competitions are held in the school, images of Hindu gods and goddesses are most common. Sanskrit is a favourite subject of many a student. Nothing new about it except that the 1,200 - odd students studying in the Hindu - run school are Muslims.

In 1983, when Ranchodbhai Kiri started Shantiniketan in the all - Muslim Juhapura area of Ahmedabad in Gujarat, only 20 percent of the students were Muslims. But when riots involving the Muslims of Juhapura and the Hindus of nearby Jivrajpark -Vejalpur affected the locality, Hindus started migrating. Today, all the students are Muslims and the school is an unparalled example of harmony. In the 2002, when a section of inflamed Muslims wanted the school closed, the parents of the students stood like a wall behind it.

Shantiniketan's principal says, "We never thought of moving the school out of the area because of the love and affection of the local Muslims. Indeed they value the high standard of education which we have set." Such is the reputation of the school that some of the local Muslim strongmen accused of involvement in communal riots are willing to protect the school during the riots.

The parents of Shantiniketan's students believe that it's the best school when it comes to the quality of the teaching. A large number of students have gone for both graduation and post graduation studies. Significantly, the only Muslim teacher in the 40 - member teaching staff, Husena Mansuri, teaches Sanskrit. Infact, she is so happy at the school that she recently declined the principalship of another Muslim - run school.

Some of the students' entries in a recent school painting competition mere truly moving. One drew a picture of Bharat Mata with a mosque and temple, while another portrayed a boy tying rakhi to his sister. Trully, Shantiniketan is a beacon of hope that, despite the provocations from both communities, Hindus and Muslims can live side-by-side with mutual respect. **[December-2004]**

1. How the Shantiniketan school starts the day ?
(a) National anthem (b) Prayer
(c) Saraswati Vandana (d) Puja

2. Write the subject which is preferred by most of the students
(a) Hindi (b) English
(c) Sanskri (d) Gujarati

3. Who protects the school during the riot times?
(a) Local Muslims (b) Hindus
(c) Politicians (d) Christians

4. Who is the teacher of Sanskrit ?
(a) Ranchodbhai Kiri (b) Manisha Vakil
(c) Husena Mansuri (d) Husena Khatoon

5. What is the hope despite the communal riots?
(a) Hindus and Muslims cannot live side by side
(b) Hindus and Muslims can live side by side
(c) Only Hindus can live
(d) Only Muslims can live

PASSAGE - 2

Knowledge creation in many cases requires creativity and idea generation. This is especially important in generating alternative decision support solutions. Some people believe that an individual's creative ability stems primarily from personality traits such as inventiveness, independence, individuality, enthusiasm, and flexibility. However, several studies have found that creativity is not so much a function of individual traits as was once believed, and that individual creativity can be learned and improved. This understanding has led innovative companies to recognise that the key to fostering creativity may be the development of an idea-nurturing work environment. Idea-generation methods and techniques, to be used by individuals or in groups, are consequently being developed. Manual methods for supporting idea generation, such as brainstorming in a group, can be very successful in certain situations. However, in other situations, such an approach is either not economically feasible or not possible. For example, manual methods in group creativity sessions will not work or will not be effective when : (1) there is no time to conduct a proper idea-generation session; (2) there is a poor facilitator (or no facilitator at all); (3) it is too expensive to conduct an idea-generation session; (4) the subject matter is too sensitive for a face-to-face session; or (5) there are not enough participants, the mix of participants is not optimal, or there is no climate for idea generation. In such cases, computerised idea-generation methods have been tried, with frequent success.

Idea-generation software is designed to help stimulate a single user or a group to produce new ideas, options and choices. The user does all the work, but the software encourages and pushes, something like a personal trainer. Although idea-generation software is still relatively new, there are several packages on the market. Various approaches are used by idea-generating software to increase the flow of ideas to the user. Idea Fisher, for example, has an associate lexicon of the English language that cross-references words and phrases. These associative links, based on analogies and metaphors, make it easy for the user to be fed words related to a given theme. Some software packages use questions to prompt the user towards new, unexplored patterns of thought. This helps users to break out of cyclical thinking patterns, conquer mental blocks, or deal with bouts of procrastination. **[December-2005]**

6. The author, in this passage has focussed on
(a) knowledge creation (b) idea-generation
(c) creativity (d) individual traits

7. Fostering creativity needs an environment of
(a) decision support systems
(b) idea-nurturing
(c) decision support solutions
(d) alternative individual factors

8. Manual methods for the support of idea-generation, in certain occasions,
(a) are alternatively effective
(b) can be less expensive
(c) do not need a facilitator
(d) require a mix of optimal participants

9. Idea-generation software works as if it is a :
(a) stimulant
(b) knowledge package
(c) user-friendly trainer
(d) climate creator

10. Mental blocks, bouts of procrastination and cyclical thinking patterns can be won when :
(a) innovative companies employ electronic thinking methods
(b) idea-generation software prompts questions
(c) manual methods are removed
(d) individuals acquire a neutral attitude towards the software

PASSAGE - 3

The superintendence, direction and control of preparation of electoral rolls for, and the conduct of, elections to Parliament and State Legislatures and elections to the offices of the President and the Vice - President of India are vested in the Election Commission of India. It is an independent constitutional authority.

Independence of the Election Commission and its insulation from executive interference is ensured by a specific provision under Article 324 (5) of the constitution that the chief Election Commissioner shall not be removed from his office except in like manner and on like grounds as a Judge of the Supreme Court and conditions of his service shall not be varied to his disadvantage after his appointment.

In C.W.P. No. 4912 of 1998 (Kushra Bharat Vs. Union of India and others), the Delhi High Court directed that information relating to Government dues owed by the candidates to the departments dealing with Government accommodation, electricity, water, telephone and transport etc. and any other dues should be furnished by the candidates and this information should be published by the election authorities under the commission. **[June-2006]**

11. The text of the passage reflects or raises certain questions:
(a) The authority of the commission cannot be challenged.
(b) This would help in stopping the criminalization of Indian politics.
(c) This would reduce substantially the number of contesting candidates.
(d) This would ensure fair and free elections.

12. According to the passage, the Election Commission is an independent constitutional authority. This is under Article No.
(a) 324 (b) 356
(c) 246 (d) 161

13. Independence of the Commission means:
(a) have a constitutional status.
(b) have legislative powers.
(c) have judicial powers.
(d) have political powers.

14. Fair and free election means:
(a) transparency
(b) to maintain law and order
(c) regional considerations
(d) role for pressure groups

15. The Chief Election Commissioner can be removed from his office under Article :
(a) 125 (b) 352
(c) 226 (d) 324

PASSAGE - 4

After almost three decades of contemplating Swarovski-encrusted navels on increasing flat abs, the Mumbai film industry is on a discovery of India and itself. With budgets of over 30 crore each, four soon to be released movies by premier directors are exploring the idea of who we are and redefining who the other is. It is a fundamental question which the bling-bling, glam-sham and disham-disham tends to avoid. It is also a question which binds an audience when the lights go dim and the projector rolls: as a nation, who are we? As a people, where are we going?

The Germans coined a word for it, zeitgeist, which perhaps Yash Chopra would not care to pronounce. But at 72, he remains the person who can best capture it. After being the first to project the diasporic Indian on screen in *Lamhe* in 1991, he has returned to his roots in a new movie. *Veer Zaara*, set in 1986, where Pakistan, the traditional other, the part that got away, is the lover and the saviour. In Subhash Ghai's *Kisna*, set in 1947, the other is the English woman. She is not a memsahib, but a mehbooba. In Ketan Mehta's *The Rising*, the East India Englishman is not the evil oppressor of countless cardboard characterisations, which span the spectrum from *Jewel in the Crown* to *Kranti*, but an honourable friend.

This is Manoj Kumar's *Desh Ki Dharti* with a difference: there is culture, not contentious politics; balle balle, not bombs: no dooriyan (distance), only nazdeekiyan (closeness).

All four films are heralding a new hero and heroine. The new hero is fallible and vulnerable, committed to his dharma, but also not afraid of failure - less of a boy and more of a man. He even has a grown up name: Veer Pratap Singh in *Veer-Zaara* and Mohan Bhargav in *Swades*. The new heroine is not a babe, but often a bebe, dressed in traditional Punjabi clothes, often with the stereotypical body type as well, as in *Bride and Prejudice* of Gurinder Chadha. **[December-2006]**

16. Which word Yash Chopra would not be able to pronounce?
(a) Bling – bling (b) Zeitgeist
(c) Montaz (d) Dooriyan

17. Who made 'Lamhe' in 1991?
(a) Subhash Ghai (b) Yash Chopra
(c) Aditya Chopra (d) Sakti Samanta

18. Which movie is associated with Manoj Kumar?
(a) Jewel in the Crown (b) Kisna
(c) Zaara (d) Desh Ki Dharti

19. Which is the latest film by Yash Chopra?
(a) Deewar
(b) Kabhi Kabhi
(c) Dilwale Dulhaniya Le Jayenge
(d) Veer Zaara

20. Which is the dress of the heroine in 'Veer-Zaara'?
(a) Traditional Gujarati Clothes
(b) Traditional Bengali Clothes
(c) Traditional Punjabi Clothes
(d) Traditional Madras Clothes

PASSAGE - 5

All political systems need to mediate the relationship between private wealth and public power. Those that fail risk a dysfunctional government captured by wealthy interests. Corruption is one symptom of such failure with private willingness-to-pay trumping public goals. Private individuals and business firms pay to get routine services and to get to the head of the bureaucratic queue. They pay to limit their taxes, avoid costly regulations, obtain contracts at inflated prices and get concessions and privatised firms at low prices. If corruption is endemic, public officials - both bureaucrats and elected officials - may redesign programmes and propose public projects with few public benefits and many opportunities for private profit. Of course, corruption, in the sense of bribes, pay-offs and kickbacks, is only one type of government failure. Efforts to promote 'good governance' must be broader than anti-corruption campaigns. Governments may be honest but inefficient because no one has an incentive to work productively, and narrow elites may capture the state and exert excess influence on policy. Bribery may induce the lazy to work hard and permit those not in the inner circle of cronies to obtain benefits. However, even in such cases, corruption cannot be confined to 'functional' areas. It will be a temptation whenever private benefits are positive. It may be a reasonable response to a harsh reality but, over time, it can facilitate a spiral into an even worse situation. **[June-2007]**

21. The governments which fail to focus on the relationship between private wealth and public power are likely to become:
(a) Functional (b) Dysfunctional
(c) Normal functioning (d) Good governance

22. One important symptom of bad governance is:
(a) Corruption
(b) High taxes
(c) Complicated rules and regulations
(d) High prices

23. When corruption is rampant, public officials always aim at many opportunities for:
(a) Public benefits (b) Public profit
(c) Private profit (d) Corporate gains

24. Productivity linked incentives to public/private officials is one of the indicatives for:
(a) Efficient government
(b) Bad governance
(c) Inefficient government
(d) Corruption

25. The spiralling corruption can only be contained by promoting:
(a) Private profit
(b) Anti-corruption campaign
(c) Good governance
(d) Pay-offs and kick backs

PASSAGE - 6

Gandhi's overall social and environmental philosophy is based on what human beings need rather than what they want. His early introduction to the teachings of Jains, Theosophists, Christian sermons, Ruskin and Tolstoy, and most significantly the Bhagavad Gita, were to have profound impact on the development of Gandhi's holistic thinking on humanity, nature and their ecological interrelation. His deep concern for the disadvantaged, the poor and rural population created an ambience for an alternative social thinking that was at once far-sighted, local and immediate. For Gandhi was acutely aware that the demands generated by the need to feed and sustain human life, compounded by the growing industrialization of India, far outstripped the finite resources of nature. This might nowadays appear naive or commonplace, but such pronouncements were as rare as they were heretical a century ago. Gandhi was also concerned about the destruction, under colonial and modernist designs, of the existing infrastructures which had more potential for keeping a community flourishing within ecologically-sensitive traditional patterns of subsistence, especially in the rural areas, than did the incoming Western alternatives based on nature-blind technology and the enslavement of human spirit and energies.

Perhaps the moral principle for which Gandhi is best known is that of active non-violence, derived from the traditional moral restraint of not injuring another being. The most refined expression of this value is in the great epic of the Mahabharata, (c. 100 BCE to 200 CE), where moral development proceeds through placing constraints on the liberties, desires and acquisitiveness endemic to human life. One's action is judged in terms of consequences and the impact it is likely to have on another. Jainas had generalized this principle to include all sentient creatures and biocommunities alike. Advanced Jaina monks and nuns will sweep their path to avoid harming insects and even bacteria. Non-injury is a non-negotiable universal prescription. **[December-2007]**

26. Which one of the following have a profound impact on the development of Gandhi's holistic thinking on humanity, nature and their ecological interrelations?
(a) Jain teachings (b) Christian sermons
(c) Bhagavad Gita (d) Ruskin and Tolstoy

27. Gandhi's overall social and environmental philosophy is based on human beings'
(a) need (b) desire
(c) wealth (d) welfare

28. Gandhiji's deep concern for the disadvantaged, the poor and rural population created an ambience for an alternative
(a) rural policy (b) social thinking
(c) urban policy (d) economic thinking

29. Colonial policy and modernisation led to the destruction of
(a) major industrial infrastructure
(b) irrigation infrastructure
(c) urban infrastructure
(d) rural infrastructure

30. Gandhi's active non-violence is derived from:
(a) Moral restraint of not injuring another being
(b) Having liberties, desires and acquisitiveness
(c) Freedom of action
(d) Nature-blind technology and enslavement of human spirit and energies

PASSAGE - 7

The fundamental principle is that Article 14 forbids class legislation but permits reasonable classification for the purpose of legislation which classification must satisfy the twin tests of classification being founded on an intelligible differentia which distinguishes persons or things that are grouped together from those that are left out of the group and that differentia must have a rational nexus to the object sought to be achieved by the Statute in question. The thrust of Article 14 is that the citizen is entitled to equality before law and equal protection of laws. In the very nature of things the society being composed of unequals a welfare State will have to strive by both executive and legislative action to help the less fortunate in society to ameliorate their condition so that the social and economic inequality in the society may be bridged. This would necessitate a legislative application to a group of citizens otherwise unequal and amelioration of whose lot is the object of state affirmative action. In the absence of the doctrine of classification such legislation is likely to flounder on the bed rock of equality enshrined in Article 14. The Court realistically appraising the social and economic inequality and keeping in view the guidelines on which the State action must move as constitutionally laid down in Part IV of the Constitution evolved the doctrine of classification. The doctrine was evolved to sustain a legislation or State action designed to help weaker sections of the society or some such segments of the society in need of succour. Legislative and executive action may accordingly be sustained if it satisfies the twin tests of reasonable classification and the rational principle correlated to the object sought to be achieved. The concept of equality before the law does not involve the idea of absolute equality among human beings which is a physical impossibility. All that Article 14 guarantees is a similarity of treatment contra-distinguished from identical treatment. Equality before law means that among equals the law should be equal and should be equally administered and that the likes should be treated alike. Equality before the law does not mean that things which are different shall be as though they are the same. It of course means denial of any special privilege by reason of birth, creed or the like. The legislation as well as the executive government, while dealing with diverse problems arising out of an infinite variety of human relations must of necessity have the power of making special laws, to attain any particular object and to achieve that object it must have the power of selection or classification of persons and things upon which such laws are to operate. **[June-2008]**

31. Right to equality, one of the fundamental rights, is enunciated in the constitution under Part III, Article:
(a) 12 (b) 13 (c) 14 (d) 15

32. The main thrust of Right to equality is that it permits:
(a) class legislation
(b) equality before law and equal protection under the law
(c) absolute equality
(d) special privilege by reason of birth

33. The social and economic inequality in the society can be bridged by:
(a) executive and legislative action
(b) universal suffrage
(c) identical treatment
(d) none of the above

34. The doctrine of classification is evolved to:
(a) Help weaker sections of the society
(b) Provide absolute equality
(c) Provide identical treatment
(d) None of the above

35. While dealing with diverse problems arising out of an infinite variety of human relations, the government
(a) must have the power of making special laws
(b) must not have any power to make special laws
(c) must have power to withdraw equal rights
(d) none of the above

PASSAGE - 8

Radically changing monsoon patterns, reduction in the winter rice harvest and a quantum increase in respiratory diseases all part of the environmental doomsday scenario which is reportedly playing out in South Asia. According to a United Nations Environment Programme report, a deadly three-kilometer deep blanket of pollution comprising a fearsome, cocktail of ash, acids, aerosols and other particles has enveloped in this region. For India, already struggling to cope with a drought, the implication of this are devastating and further crop failure will amount to a life and death question for many Indians. The increase in premature deaths will have adverse social and economic consequences and a rise in morbidities will place an unbearable burden on our crumbling health system. And there is no one to blame but ourselves. Both official and corporate India has always been allergic to any mention of clean technology. Most mechanical two wheelers roll of the assembly line without proper pollution control system. Little effort is made for R&D on simple technologies, which could make a vital difference to people's lives and the environment.

However, while there is no denying that South Asia must clean up its act, skeptics might question the timing of the haze report. The Kyoto meet on climate change is just two weeks away and the stage is set for the usual battle between the developing world and the West, particularly the Unites States of America. President Mr. Bush has adamantly refused to sign any protocol, which would mean a change in American consumption level. U.N. environment report will likely find a place in the U.S. arsenal as it plants an accusing finger towards controls like India and China. Yet the U.S.A. can hardly deny its own dubious role in the matter of erasing trading quotas.

Richer countries can simply buy up excess credits from poorer countries and continue to pollute. Rather than try to get the better of developing countries, who undoubtedly have taken up environmental shortcuts in their bid to catch up with the West, the USA should take a look at the environmental profigacy, which is going on within. From opening up virgin territories for oil exploration to relaxing the standards for drinking water, Mr. Bush's policies are not exactly beneficial, not even to America's interests. We realize that we are all in this together and that pollution anywhere should be a global concern otherwise there will only be more tunnels at the end of the tunnel. **[December-2008]**

36. Both official and corporate India is allergic to:
(a) Failure of Monsoon
(b) Poverty and Inequality
(c) Slowdown in Industrial Production
(d) Mention of Clean Technology

37. If the rate of premature death increases it will:
(a) Exert added burden on the crumbling economy
(b) Have adverse social and economic consequences
(c) Make positive effect on our effort to control population
(d) Have less job aspirants in the society

38. According to the passage, the two wheeler industry is not adequately concerned about:
(a) Passenger safety on the roads
(b) Life cover insurance of the vehicle owner
(c) Pollution control system in the vehicle
(d) Rising cost of the two wheelers

39. What could be the reason behind timing of the haze report just before the Kyoto meet?
(a) United Nations is working hand-in-glove with U.S.A.
(b) Organizers of the forthcoming meet to teach a lesson to the U.S.A.
(c) Drawing attention of the world towards devastating effects of environment degradation.
(d) U.S.A. wants to use it as a handle against the developing countries in the forthcoming meet

40. Which of the following is the indication of environmental degradation in South Asia?
(a) Social and economic inequality
(b) Crumbling health care system
(c) Inadequate pollution control system
(d) Radically changing monsoon pattern

PASSAGE - 9

While the British rule in India was detrimental to the economic development of the country, it did help in starting of the process of modernizing Indian society and formed several progressive institutions during that process. One of the most beneficial institutions, which were initiated by the British, was democracy. Nobody can dispute that despite its many shortcomings; democracy was and is far better alternative to the arbitrary rule of the rajas and nawabs, which prevailed in India in the pre-British days.

However, one of the harmful traditions of British democracy inherited by India was that of conflict instead of cooperation between elected members. This was its essential feature. The party, which got the support of the majority of elected members, formed the Government while the others constituted a standing opposition. The existence of the opposition to those in power was and is regarded as a hallmark of democracy.

In principle, democracy consists of rule by the people; but where direct rule is not possible, it's rule by persons elected by the people. It is natural that there would be some differences of opinion among the elected members as in the rest of the society.

Normally, members of any organizations have differences of opinion between themselves on different issues but they manage to work on the basis of a consensus and they do not normally form a division between some who are in majority and are placed in power, while treating the others as in opposition.

The members of an organization usually work on consensus. Consensus simply means that after an adequate discussion, members agree that the majority opinion may prevail for the time being. Thus persons who form a majority on one issue and whose opinion is allowed to prevail may not be on the same side if there is a difference on some other issue.

It was largely by accident that instead of this normal procedure, a two party system came to prevail in Britain and that is now being generally taken as the best method of democratic rule.

Many democratically inclined persons in India regret that such a two party system was not brought about in the country. It appears that to have two parties in India – of more or less equal strength - is a virtual impossibility. Those who regret the absence of a two-party system should take the reasons into consideration.

When the two party system got established in Britain, there were two groups among the rules (consisting of a limited electorate) who had the same economic interests among themselves and who therefore formed two groups within the selected members of Parliament.

There were members of the British aristocracy (which landed interests and consisting of lord, barons etc) and members of the new commercial class consisting of merchants and artisans. These groups were more or less of equal strength and they were able to establish their separate rule at different times. **[June-2009]**

41. In pre-British period, when India was ruled by the independent rulers:
(a) Peace and prosperity prevailed in the society
(b) People were isolated from political affairs
(c) Public opinion was inevitable for policy making
(d) Law was equal for one and all

42. What is the distinguishing feature of the democracy practiced in Britain?
(a) End to the rule of might is right.
(b) Rule of the people, by the people and for the people.
(c) It has stood the test of time.
(d) Cooperation between elected members.

43. Democracy is practiced where:
(a) Elected members form a uniform opinion regarding policy matter.
(b) Opposition is more powerful than the ruling combine.
(c) Representatives of masses.
(d) None of these.

44. Which of the following is true about the British rule in India?
(a) It was behind the modernization of the Indian society.
(b) India gained economically during that period.
(c) Various establishments were formed for the purpose of progress.
(d) None of these.

45. Who became the members of the new commercial class during that time?
(a) British Aristocrats (b) Lord and barons
(c) Political Persons (d) Merchants and artisans

PASSAGE - 10

The decisive shift in British Policy really came about under mass pressure in the autumn and winter of 1945 to 46 – the months which Perderel Moon while editing Wavell's Journal has perceptively described as 'The Edge of a Volcano'. Very foolishly, the British initially decided to hold public trials of several hundreds of the 20,000 I.N.A. prisoners (as well as dismissing from service and

detaining without trial no less than 7,000). They compounded the folly by holding the first trial in the Red Fort, Delhi in November 1945, and putting on the dock together a Hindu, a Muslim and a Sikh (P.K. Sehgal, Shah Nawaz, Gurbaksh Singh Dhillon). Bhulabhai Desai, Tejbahadur Sapru and Nehru appeared for the defence (the latter putting on his barrister's gown after 25 years), and the Muslim League also joined the countrywide protest. On 20 November, an Intelligence Bureau note admitted that "there has seldom been a matter which has attracted so much Indian public interest and, it is safe to say, sympathy … this particular brand of sympathy cuts across communal barriers.' A journalist (B. Shiva Rao) visiting the Red Fort prisoners on the same day reported that 'There is not the slightest feeling among them of Hindu and Muslim … A majority of the men now awaiting trial in the Red Fort is Muslim. Some of these men are bitter that Mr. Jinnah is keeping alive a controversy about Pakistan.' The British became extremely nervous about the I.N.A. spirit spreading to the Indian Army, and in January the Punjab Governor reported that a Lahore reception for released I.N.A. prisoners had been attended by Indian soldiers in uniform. **[December-2009]**

46. Which heading is more appropriate to assign to the above passage ?
(a) Wavell's Journal (b) Role of Muslim League
(c) I.N.A. Trials (d) Red Fort Prisoners

47. The trial of P.K. Sehgal, Shah Nawaz and Gurbaksh Singh Dhillon symbolises
(a) communal harmony
(b) threat to all religious persons
(c) threat to persons fighting for the freedom
(d) British reaction against the natives

48. I.N.A. stands for
(a) Indian National Assembly
(b) Indian National Association
(c) Inter-national Association
(d) Indian National Army

49. 'There has seldom been a matter which has attracted so much Indian Public Interest and, it is safe to say, sympathy … this particular brand of sympathy cuts across communal barriers.'
Who sympathises to whom and against whom?
(a) Muslims sympathised with Shah Nawaz against the British
(b) Hindus sympathised with P.K. Sehgal against the British
(c) Sikhs sympathised with Gurbaksh Singh Dhillon against the British
(d) Indians sympathised with the persons who were to be trialled

50. The majority of people waiting for trial outside the Red Fort and criticising Jinnah were the
(a) Hindus (b) Muslims
(c) Sikhs (d) Hindus and Muslims both

51. The sympathy of Indian soldiers in uniform with the released I.N.A. prisoners at Lahore indicates
(a) Feeling of Nationalism and Fraternity
(b) Rebellious nature of Indian soldiers
(c) Simply to participate in the reception party
(d) None of the above

PASSAGE - 11

The phrase "What is it like ?" stands for a fundamental thought process. How does one go about observing and reporting on things and events that occupy segments of earth space ? Of all the infinite variety of phenomena on the face of the earth, how does one decide what phenomena to observe ? There is no such thing as a complete description of the earth or any part of it, for every microscopic point on the earth's surface differs from every other such point. Experience shows that the things observed are already familiar, because they are like phenomena that occur at home or because they resemble the abstract images and models developed in the human mind.

How are abstract images formed? Humans alone among the animals possess language; their words symbolize not only specific things but also mental images of classes of things. People can remember what they have seen or experienced because they attach a word symbol to them.

During the long record of our efforts to gain more and more knowledge about the face of the earth as the human habitat, there has been a continuing interplay between things and events. The direct observation through the senses is described as a percept; the mental image is described as a concept. Percepts are what some people describe as reality, in contrast to mental images, which are theoretical, implying that they are not real.

The relation of Percept to Concept is not as simple as the definition implies. It is now quite clear that people of different cultures or even individuals in the same culture develop different mental images of reality and what they perceive is a reflection of these preconceptions. The direct observation of things and events on the face of the earth is so clearly a function of the mental images of the mind of the observer that the whole idea of reality must be reconsidered.

Concepts determine what the observer perceives, yet concepts are derived from the generalizations of previous percepts. What happens is that the educated observer is taught to accept a set of concepts and then sharpens or changes these concepts during a professional career. In any one field of scholarship, professional opinion at one time determines what concepts and procedures are acceptable, and these form a kind of model of scholarly behaviour. **[June-2010]**

52. The problem raised in the passage reflects on
(a) thought process (b) human behaviour
(c) cultural perceptions (d) professional opinion

53. According to the passage, human beings have mostly in mind
(a) Observation of things
(b) Preparation of mental images
(c) Expression through language
(d) To gain knowledge

54. Concept means
(a) A mental image
(b) A reality
(c) An idea expressed in language form
(d) All the above

55. The relation of Percept to Concept is
(a) Positive (b) Negative
(c) Reflective (d) Absolute

56. In the passage, the earth is taken as
(a) The Globe
(b) The Human Habitat
(c) A Celestial Body
(d) A Planet

57. Percept means
(a) Direct observation through the senses
(b) A conceived idea
(c) Ends of a spectrum
(d) An abstract image

PASSAGE - 12

It should be remembered that the nationalist movement in India, like all nationalist movements, was essentially a bourgeois movement. It represented the natural historical stage of development, and to consider it or to criticise it as a working-class movement is wrong. Gandhi represented that movement and the Indian masses in relation to that movement to a supreme degree, and he became the voice of Indian people to that extent. The main contribution of Gandhi to India and the Indian masses has been through the powerful movements which he launched through the National Congress. Through nation-wide action he sought to mould the millions, and largely succeeded in doing so, and changing them from a demoralised, timid and hopeless mass, bullied and crushed by every dominant interest, and incapable of resistance, into a people with self-respect and self-reliance, resisting tyranny, and capable of united action and sacrifice for a larger cause.

Gandhi made people think of political and economic issues and every village and every bazaar hummed with argument and debate on the new ideas and hopes that filled the people. That was an amazing psychological change. The time was ripe for it, of course, and circumstances and world conditions worked for this change. But a great leader is necessary to take advantage of circumstances and conditions. Gandhi was that leader, and he released many of the bonds that imprisoned and disabled our minds, and none of us who experienced it can ever forget that great feeling of release and exhilaration that came over the Indian people.

Gandhi has played a revolutionary role in India of the greatest importance because he knew how to make the most of the objective conditions and could reach the heart of the masses, while groups with a more advanced ideology functioned largely in the air because they did not fit in with those conditions and could therefore not evoke any substantial response from the masses.

It is perfectly true that Gandhi, functioning in the nationalist plane, does not think in terms of the conflict of classes, and tries to compose their differences. But the action he has indulged and taught the people has inevitably raised mass consciousness tremendously and made social issues vital. Gandhi and the Congress must be judged by the policies they pursue and the action they indulge in. But behind this, personality counts and colours those policies and activities. In the case of very exceptional person like Gandhi the question of personality becomes especially important in order to understand and appraise him. To us he has represented the spirit and honour of India, the yearning of her sorrowing millions to be rid of their innumerable burdens, and an insult to him by the British Government or others has been an insult to India and her people. **[December-2010]**

58. Which one of the following is true of the given passage ?
(a) The passage is a critique of Gandhi's role in Indian movement for independence.
(b) The passage hails the role of Gandhi in India's freedom movement.
(c) The author is neutral on Gandhi's role in India's freedom movement.
(d) It is an account of Indian National Congress's support to the working-class movement.

59. The change that the Gandhian movement brought among the Indian masses was
(a) Physical (b) Cultural
(c) Technological (d) Psychological

60. To consider the nationalist movement or to criticise it as a working-class movement was wrong because it was a
(a) historical movement
(b) voice of the Indian people
(c) bourgeois movement
(d) movement represented by Gandhi

61. Gandhi played a revolutionary role in India because he could
(a) preach morality
(b) reach the heart of Indians
(c) see the conflict of classes
(d) lead the Indian National Congress

62. Groups with advanced ideology functioned in the air as they did not fit in with
(a) objective conditions of masses
(b) the Gandhian ideology
(c) the class consciousness of the people
(d) the differences among masses

63. The author concludes the passage by
(a) criticising the Indian masses
(b) the Gandhian movement
(c) pointing out the importance of the personality of Gandhi
(d) identifying the sorrows of millions of Indians

PASSAGE - 13

All historians are interpreters of text if they be private letters, Government records or parish birthlists or whatever. For most kinds of historians, these are only the necessary means to understanding something other than the texts themselves, such as a political action or a historical trend, whereas for the intellectual historian, a full understanding of his chosen texts is itself the aim of his enquiries. Of course, the intellectual history is particularly prone to draw on the focus of other disciplines that are habitually interpreting texts for purposes of their own, probing the reasoning that ostensibly connects premises and conclusions. Furthermore, the boundaries with adjacent subdisciplines are shifting and indistinct : the history of art and the history of science both claim a certain autonomy, partly just because they require specialised technical skills, but both can also be seen as part of a wider intellectual history, as is evident when one considers, for example, the common stock of knowledge about cosmological beliefs or moral ideals of a period.

Like all historians, the intellectual historian is a consumer rather than a producer of 'methods'. His distinctiveness lies in which

aspect of the past he is trying to illuminate, not in having exclusive possession of either a corpus of evidence or a body of techniques. That being said, it does seem that the label 'intellectual history' attracts a disproportionate share of misunderstanding.

It is alleged that intellectual history is the history of something that never really mattered. The long dominance of the historical profession by political historians bred a kind of philistinism, an unspoken belief that power and its exercise was 'what mattered'. The prejudice was reinforced by the assertion that political action was never really the outcome of principles or ideas that were 'more flapdoodle'. The legacy of this precept is still discernible in the tendency to require ideas to have 'licensed' the political class before they can be deemed worthy of intellectual attention, as if there were some reasons why the history of art or science, of philosophy or literature, were somehow of interest and significance than the history of Parties or Parliaments. Perhaps in recent years the mirror-image of this philistinism has been more common in the claim that ideas of any one is of systematic expression or sophistication do not matter, as if they were only held by a minority. **[June-2011]**

64. An intellectual historian aims to fully understand
(a) the chosen texts of his own
(b) political actions
(c) historical trends
(d) his enquiries

65. Intellectual historians do not claim exclusive possession of
(a) conclusions (b) any corpus of evidence
(c) distinctiveness (d) habitual interpretation

66. The misconceptions about intellectual history stem from
(a) a body of techniques
(b) the common stock of knowledge
(c) the dominance of political historians
(d) cosmological beliefs

67. What is philistinism ?
(a) Reinforcement of prejudice
(b) Fabrication of reasons
(c) The hold of land-owning classes
(d) Belief that power and its exercise matter

68. Knowledge of cosmological beliefs or moral ideas of a period can be drawn as part of
(a) literary criticism (b) history of science
(c) history of philosophy (d) intellectual history

69. The claim that ideas of any one is of systematic expression do not matter, as if they were held by a minority, is
(a) to have a licensed political class
(b) a political action
(c) a philosophy of literature
(d) the mirror-image of philistinism

PASSAGE - 14

The catalytic fact of the twentieth century is uncontrollable development, consumerist society, political materialism, and spiritual devaluation. This inordinate development has led to the transcendental 'second reality' of sacred perception that biologically transcendence is a part of human life. As the century closes, it dawns with imperative vigour that the 'first reality' of enlightened rationalism and the 'second reality' of the Beyond have to be harmonised in a worthy state of man. The *de facto* values describe what we are, they portray the 'is' of our ethic, they are *est* values (Latin *est* means 'is'). The ideal values tell us what we ought to be, they are *esto* values (Latin *esto* means 'ought to be'). Both have to be in the ebb and flow of consciousness. The ever new science and technology and the ever-perennial faith are two modes of one certainty, that is the wholeness of man, his courage to be, his share in being.

The materialistic foundations of science have crumbled down. Science itself has proved that matter is energy, processes are as valid as facts, and affirmed the non-materiality of the universe. The encounter of the 'two cultures', the scientific and the humane, will restore the normal vision, and will be the bedrock of a 'science of understanding' in the new century. It will give new meaning to the ancient perception that quantity (measure) and quality (value) coexist at the root of nature. Human endeavours cannot afford to be humanistically irresponsible. **[December-2011]**

70. The problem raised in the passage reflects overall on
(a) Consumerism (b) Materialism
(c) Spiritual devaluation (d) Inordinate development

71. The '*de facto*' values in the passage means
(a) What is (b) What ought to be
(c) What can be (d) Where it is

72. According to the passage, the 'first reality' constitutes
(a) Economic prosperity
(b) Political development
(c) Sacred perception of life
(d) Enlightened rationalism

73. Encounter of the 'two cultures', the scientific and the human implies
(a) Restoration of normal vision
(b) Universe is both material and non-material
(c) Man is superior to nature
(d) Co-existence of quantity and quality in nature

74. The contents of the passage are
(a) Descriptive (b) Prescriptive
(c) Axiomatic (d) Optional

75. The passage indicates that science has proved that
(a) universe is material (b) matter is energy
(c) nature has abundance (d) humans are irresponsible

PASSAGE - 15

James Madison said, "A people who mean to be their own governors must arm themselves with power that knowledge gives." In India, the Official Secrets Act, 1923 was a convenient smokescreen to deny members of the public access to information. Public functioning has traditionally been shrouded in secrecy. But in a democracy in which people govern themselves, it is necessary to have more openness. In the maturing of our democracy, right to information is a major step forward; it enables citizens to participate fully in the decision-making process that affects their lives so profoundly. It is in this context that the address of the Prime Minister in the Lok Sabha is significant. He said, "I would only like to see that everyone, particularly our civil servants, should see the Bill in a positive spirit; not as a draconian law for paralyzing Government, but as an instrument for improving

Government-Citizen interface resulting in a friendly, caring and effective Government functioning for the good of our People." He further said, "This is an innovative Bill, where there will be scope to review its functioning as we gain experience. Therefore, this is a piece of legislation, whose working will be kept under constant reviews."

The Commission, in its Report, has dealt with the application of the Right to Information in Executive, Legislature and Judiciary. The judiciary could be a pioneer in implementing the Act in letter and spirit because much of the work that the Judiciary does is open to public scrutiny, Government of India has sanctioned an e-governance project in the Judiciary for about ₹ 700 crores which would bring about systematic classification, standardization and categorization of records. This would help the judiciary to fulfil its mandate under the Act. Similar capacity building would be required in all other public authorities. The transformation from nontransparency to transparency and public accountability is the responsibility of all three organs of State. **[June-2012]**

76. A person gets power
- (a) by acquiring knowledge.
- (b) from the Official Secrets Act, 1923.
- (c) through openings.
- (d) by denying public information.

77. Right to Information is a major step forward to
- (a) enable citizens to participate fully in the decision making process.
- (b) to make the people aware of the Act.
- (c) to gain knowledge of administration.
- (d) to make the people Government friendly.

78. The Prime Minister considered the Bill
- (a) to provide power to the civil servants.
- (b) as an instrument for improving Government-citizen interface resulting in a friendly, caring and effective Government.
- (c) a draconian law against the officials.
- (d) to check the harassment of the people.

79. The Commission made the Bill effective by
- (a) extending power to the executive authorities.
- (b) combining the executive and legislative power.
- (c) recognizing Judiciary a pioneer in implementing the act in letter and spirit.
- (d) educating the people before its implementation.

80. The Prime Minister considered the Bill innovative and hoped that
- (a) it could be reviewed based on the experience gained on its functioning.
- (b) the civil servants would see the Bill in a positive spirit.
- (c) it would not be considered as a draconian law for paralyzing Government
- (d) all the above

81. The transparency and public accountability is the responsibility of three organs of the State. These three organs are
- (a) Lok Sabha, Rajya Sabha and Judiciary
- (b) Lok Sabha, Rajya Sabha and Executive
- (c) Judiciary, Legislature and the Commission
- (d) Legislature, Executive and Judiciary

PASSAGE - 16

The popular view of towns and cities in developing countries and of urbanization process is that despite the benefits and comforts it brings, the emergence of such cities connotes environmental degradation, generation of slums and squatters, urban poverty, unemployment, crimes, lawlessness, traffic chaos etc. But what is the reality ? Given the unprecedental increase in urban population over the last 50 years from 300 million in 1950 to 2 billion in 2000 in developing countries, the wonder really is how well the world has coped, and not how badly.

In general, the urban quality of life has improved in terms of availability of water and sanitation, power, health and education, communication and transport. By way of illustration, a large number of urban residents have been provided with improved water in urban areas in Asia's largest countries such as China, India, Indonesia and Philippines. Despite that, the access to improved water in terms of percentage of total urban population seems to have declined during the last decade of 20th century, though in absolute numbers, millions of additional urbanites, have been provided improved services. These countries have made significant progress in the provision of sanitation services too, together, providing for an additional population of more than 293 million citizens within a decade (1990-2000). These improvements must be viewed against the backdrop of rapidly increasing urban population, fiscal crunch and strained human resources and efficient and quality-oriented public management. **[December-2012**

82. The popular view about the process of urbanization in developing countries is**]**
- (a) Positive (b) Negative
- (c) Neutral (d) Unspecified

83. The average annual increase in the number of urbanites in developing countries, from 1950 to 2000 A.D. was close to
- (a) 30 million (b) 40 million
- (c) 50 million (d) 60 million

84. The reality of urbanization is reflected in
- (a) How well the situation has been managed.
- (b) How badly the situation has gone out of control.
- (c) How fast has been the tempo of urbanization.
- (d) How fast the environment has degraded.

85. Which one of the following is not considered as an indicator of urban quality of life?
- (a) Tempo of urbanization
- (b) Provision of basic services
- (c) Access to social amenities
- (d) All the above

86. The author in this passage has tried to focus on
- (a) Extension of Knowledge
- (b) Generation of Environmental Conscio-usness
- (c) Analytical Reasoning
- (d) Descriptive Statement

87. In the above passage, the author intends to state
- (a) The hazards of the urban life
- (b) The sufferings of the urban life
- (c) The awareness of human progress
- (d) The limits to growth

PASSAGE - 17

The Taj Mahal has become one of the world's best known monuments. This domed white marble structure is situated on a high plinth at the southern end of a four-quartered garden, evoking the gardens of paradise, enclosed within walls measuring 305 by 549 metres. Outside the walls, in an area known as Mumtazabad, were living quarters for attendants, markets, serais and other structures built by local merchants and nobles. The tomb complex and the other imperial structures of Mumtazabad were maintained by the income of thirty villages given specifically for the tomb's support. The name Taj Mahal is unknown in Mughal chronicles, but it is used by contemporary Europeans in India, suggesting that this was the tomb's popular name. In contemporary texts, it is generally called simply the Illuminated Tomb (Rauza-i-Munavvara).

Mumtaz Mahal died shortly after delivering her fourteenth child in 1631. The Mughal court was then residing in Burhanpur. Her remains were temporarily buried by the griefstricken emperor in a spacious garden known as Zainabad on the bank of the river Tapti. Six months later her body was transported to Agra, where it was interred in land chosen for the mausoleum. This land, situated south of the Mughal city on the bank of the Jamuna, had belonged to the Kachhwaha rajas since the time of Raja Man Singh and was purchased from the then current raja, Jai Singh. Although contemporary chronicles indicate Jai Singh's willing cooperation in this exchange, extant farmans (imperial commands) indicate that the final price was not settled until almost two years after the mausoleum's commencement. Jai Singh's further cooperation was insured by imperial orders issued between 1632 and 1637 demanding that he provide stone masons and carts to transport marble from the mines at Makrana, within his "ancestral domain", to Agra where both the Taj Mahal and Shah Jahan's additions to the Agra fort were constructed concurrently.

Work on the mausoleum was commenced early in 1632. Inscriptional evidence indicates much of the tomb was completed by 1636. By 1643, when Shah Jahan most lavishly celebrated the 'Urs ceremony for Mumtaz Mahal', the entire complex was virtually complete. **[June-2013]**

88. Marble stone used for the construction of the Taj Mahal was brought from the ancestral domain of Raja Jai Singh. The name of the place where mines of marble were situated, is
(a) Burhanpur (b) Makrana
(c) Amber (d) Jaipur

89. The popular name Taj Mahal was given by
(a) Shah Jahan (b) Tourists
(c) Public (d) European travellers

90. Point out the true statement from the following :
(a) Marble was not used for the construction of the Taj Mahal.
(b) Red sand stone is non-visible in the Taj Mahal complex.
(c) The Taj Mahal is surrounded by a four-quartered garden known as Chahr Bagh.
(d) The Taj Mahal was constructed to celebrate the 'Urs ceremony for Mumtaz Mahal'.

91. In the contemporary texts the Taj Mahal is known
(a) Mumtazabad (b) Mumtaz Mahal
(c) Zainabad (d) Rauza-i-Munavvara

92. The construction of the Taj Mahal was completed between the period
(a) 1632 – 1636 A.D. (b) 1630 – 1643 A.D.
(c) 1632 – 1643 A.D. (d) 1636 – 1643 A.D.

93. The document indicating the ownership of land, where the Taj Mahal was built, is known as
(a) Farman (b) Sale Deed
(c) Sale-Purchase Deed (d) None of the above

PASSAGE - 18

I had occasion to work with her closely during the Women's International Year in 1975 when she was chairing a Steering Committee and made me the member in charge of publicity. Representatives from different political parties and women's organizations were on the committee and though the leftists claimed a sort of proprietary right over her, Aruna encouraged and treated all members alike. It was not her political affiliations or her involvement in a particular cause, which won her respect and recognition, but her utter honesty in public life, her integrity and her compassion for the oppressed which made her an adorable person. She had the courage to differ with and defy the mightiest in the land; yet her human spirit prompted her to work in the worst of slums to offer succour to the poor and the exploited.

In later years – around late eighties and early nineties – Aruna Asaf Ali's health began to deteriorate. Though her mind remained alert, she could not actively take up her pet causes – action for women's advancement, planning for economic justice, role of media, reaffirmation of values in public affairs etc. Slowly, her movements were restricted and Aruna who had drawn sustenance from common people, from her involvement in public life, became a lonely person. She passed away in July 1996.

[September-2013]

94. Which Committee was chaired by Aruna ?
(a) Women's International Year's Committee
(b) Steering Committee of Women's International Year
(c) A Committee of Publicity
(d) Women's Organizations

95. Who were made the members of the Committee of Publicity?
Choose the answer from codes given below :
(i) Representatives from different political parties.
(ii) Representatives from the leftist parties.
(iii) Representatives from the women's organizations.
(iv) None of the above.
Codes :
(a) (i), (iii) (b) (i), (ii)
(c) (i), (ii), (iii) (d) (iv)

96. Aruna earned respect because of
(a) she identified with the leftists
(b) she did not associate with any political party
(c) chairing a Steering Committee
(d) she identified with women's organizations

97. Who tried to monopolize Aruna as their proprietary right?
(a) Women Organizations
(b) Leftists
(c) Steering Committee
(d) Some Political Parties

98. Aruna's health began to deteriorate from
(a) 1985 – 2002 (b) 1998 – 2000
(c) 1981 – 2000 (d) 1989 – 2001

99. Aruna's pet cause(s) in her life was/ were
(a) Role of media
(b) Economic justice
(c) Reaffirmation of values in public affairs
(d) All the above

PASSAGE - 19

Heritage conservation practices improved worldwide after the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM) was established with UNESCO's assistance in 1959. The inter-governmental organisation with 126 member states has done a commendable job by training more than 4,000 professionals, providing practice standards, and sharing technical expertise. In this golden jubilee year, as we acknowledge its key role in global conservation, an assessment of international practices would be meaningful to the Indian conservation movement. Consistent investment, rigorous attention, and dedicated research and dissemination are some of the positive lessons to imbibe. Countries such as Italy have demonstrated that prioritising heritage with significant budget provision pays. On the other hand, India, which is no less endowed in terms of cultural capital, has a long way to go. Surveys indicate that in addition to the 6,600 protected monuments, there are over 60,000 equally valuable heritage structures that await attention. Besides the small group in the service of Archaeological Survey of India, there are only about 150 trained conservation professionals. In order to overcome this severe shortage the emphasis has been on setting up dedicated labs and training institutions. It would make much better sense for conservation to be made part of mainstream research and engineering institutes, as has been done in Europe. Increasing funding and building institutions are the relatively easy part. The real challenge is to redefine international approaches to address local contexts. Conservation cannot limit itself to enhancing the art-historical value of the heritage structures, which international charters perhaps overemphasise. The effort has to be broad-based : It must also serve as a means to improving the quality of life in the area where the heritage structures are located. The first task therefore is to integrate conservation efforts with sound development plans that take care of people living in the heritage vicinity. Unlike in western countries, many traditional building crafts survive in India, and conservation practices offer an avenue to support them. This has been acknowledged by the Indian National Trust for Art and Cultural Heritage charter for conservation but is yet to receive substantial state support. More strength for heritage conservation can be mobilised by aligning it with the green building movement. Heritage structures are essentially eco-friendly and conservation could become a vital part of the sustainable building practices campaign in future.

[December-2013]

100. The outlook for conservation heritage changed
(a) after the establishment of the International Centre for the Study of the Preservation and Restoration of Cultural Property.
(b) after training the specialists in the field.
(c) after extending UNESCO's assistance to the educational institutions.
(d) after ASI's measures to protect the monuments.

101. The inter-government organization was appreciated because of
(a) increasing number of members to 126.
(b) imparting training to professionals and sharing technical expertise.
(c) consistent investment in conservation.
(d) its proactive role in renovation and restoration.

102. Indian conservation movement will be successful if there would be
(a) Financial support from the Government of India.
(b) Non-governmental organisations role and participation in the conservation movement.
(c) consistent investment, rigorous attention, and dedicated research and dissemination of awareness for conservation.
(d) Archaeological Survey of India's meaningful assistance.

103. As per the surveys of historical monuments in India, there is very small number of protected monuments. As per given the total number of monuments and enlisted number of protected monuments, percentage comes to
(a) 10 percent (b) 11 percent
(c) 12 percent (d) 13 percent

104. What should India learn from Europe to conserve our cultural heritage ?
(i) There should be significant budget provision to conserve our cultural heritage.
(ii) Establish dedicated labs and training institutions.
(iii) Force the government to provide sufficient funds.
(iv) Conservation should be made part of mainstream research and engineering institutes.

Choose correct answer from the codes given below :
(a) (i), (ii), (iii), (iv) (b) (i), (ii), (iv)
(c) (i), (ii) (d) (i), (iii), (iv)

105. INTACH is known for its contribution for conservation of our cultural heritage. The full form of INTACH is
(a) International Trust for Art and Cultural Heritage.
(b) Intra-national Trust for Art and Cultural Heritage
(c) Integrated Trust for Art and Cultural Heritage
(d) Indian National Trust for Art and Cultural Heritage

PASSAGE - 20

Traditional Indian Values must be viewed both from the angle of the individual and from that of the geographically delimited agglomeration of peoples or groups enjoying a common system of leadership which we call the 'State'. The Indian 'State's' special feature is the peaceful, or perhaps mostly peaceful, co-existence of social groups of various historical provenances which mutually adhere in a geographical, economic, and political sense, without ever assimilating to each other in social terms, in ways of thinking, or even in language. Modern Indian law will determine certain rules, especially in relation to the regime of the family, upon the basis of how the loin-cloth is tied, or how the turban is worn, for this may identify the litigants as members of a regional group, and therefore as participants in its traditional law, though their ancestors left the region three or four centuries earlier. The use of

the word 'State' above must not mislead us. There was no such thing as a conflict between the individual and the State, atleast before foreign governments became established, just as there was no concept of state 'sovereignty' or of any church-and-state dichotomy.

Modern Indian 'secularism' has an admittedly peculiar feature : It requires the state to make a fair distribution of attention and support amongst all religions. These blessed aspects of India's famed tolerance (Indian kings so rarely persecuted religious groups that the exceptions prove the rule) at once struck Portuguese and other European visitors to the West Coast of India in the sixteenth century, and the impression made upon them in this and other ways gave rise, at one remove, to the basic constitution of Thomas More's Utopia. There is little about modern India that strikes one at once as Utopian : but the insistence upon the inculcation of norms, and the absence of bigotry and institutionalized exploitation of human or natural resources, are two very different features which link the realities of India and her tradition with the essence of all Utopians. **[June-2014]**

106. Which of the following is a special feature of the Indian State?
- (a) Peaceful co-existence of people under a common system of leadership
- (b) Peaceful co-existence of social groups of different historical provenances attached to each other in a geographical, economic and political sense
- (c) Social integration of all groups
- (d) Cultural assimilation of all social groups.

107. The author uses the word 'State' to highlight
- (a) Antagonistic relationship between the state and the individual throughout the period of history.
- (b) Absence of conflict between the state and the individuals upto a point in time.
- (c) The concept of state sovereignty.
- (d) Dependence on religion.

108. Which one is the peculiar feature of modern Indian 'Secularism' ?
- (a) No discrimination on religious considerations
- (b) Total indifference to religion
- (c) No space for social identity
- (d) Disregard for social law

109. The basic construction of Thomas More's Utopia was inspired by
- (a) Indian tradition of religious tolerance.
- (b) Persecution of religious groups by Indian rulers.
- (c) Social inequality in India.
- (d) European perception of Indian State.

110. What is the striking feature of modern India?
- (a) A replica of Utopian State
- (b) Uniform laws
- (c) Adherence to traditional values
- (d) Absence of Bigotry

PASSAGE - 21

The literary distaste for politics, however, seems to be focused not so much on the largely murky practice of politics in itself as a subject of literary representation but rather more on how it is often depicted in literature, i.e., on the very politics of such representation. A political novel often turns out to be not merely a novel about politics but a novel with a politics of its own, for it seeks not merely to show us how things are but has fairly definite ideas about how things should be, and precisely what one should think and do in order to make things move in that desired direction. In short, it seeks to convert and enlist the reader to a particular cause or ideology; it often is (in an only too familiar phrase) not literature but propaganda. This is said to violate the very spirit of literature which is to broaden our understanding of the world and the range of our sympathies rather than to narrow them down through partisan commitment. As John Keats said, 'We hate poetry that has a palpable design upon us'.

Another reason why politics does not seem amenable to the highest kind of literary representation seems to arise from the fact that politics by its very nature is constituted of ideas and ideologies. If political situations do not lend themselves to happy literary treatment, political ideas present perhaps an even greater problem in this regard. Literature, it is argued, is about human experiences rather than about intellectual abstractions; it deals in what is called the 'felt reality' of human flesh and blood, and in sap and savour. (rasa) rather than in and and lifeless ideas. In an extensive discussion of the matter in her book Ideas and the Novel, the American novelist Mary McCarthy observed that 'ideas are still today felt to be unsightly in the novel' though that was not so in 'former days', i.e., in the 18th and 19th centuries. Her formulation of the precise nature of the incompatibility between ideas on the one hand and the novel on the other betrays perhaps a divided conscience in the matter and a sense of dilemma shared by many writers and readers : 'An idea cannot have loose ends, but a novel, I almost think, needs them. Nevertheless, there is enough in common for the novelists to feel… the attraction of ideas while taking up arms against them — most often with weapons of mockery.' **[December-2014]**

111. According to the passage, a political novel often turns out to be a
- (a) Literary distaste for politics
- (b) Literary representation of politics
- (c) Novels with its own politics
- (d) Depiction of murky practice of politics

112. A political novel reveals
- (a) Reality of the tings
- (b) Writer's perception
- (c) Particular ideology of the readers
- (d) The spirit of literature

113. The constructs of politics by its nature is
- (a) Prevalent political situation
- (b) Ideas and Ideologies
- (c) Political propaganda
- (d) Understanding of human nature

114. Literature deals with
- (a) Human experiences in politics
- (b) Intellectual abstractions
- (c) Dry and empty ideas
- (d) Felt reality of human life

115. The observation of the novelist, May McCarthy reveals
- (a) Unseen felt ideas of today in the novel
- (b) Dichotomy of conscience on political ideas and novels
- (c) Compatibility between idea and novel
- (d) Endless idea and novels

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PASSAGE - 22

Story telling is not in our genes. Neither it is an evolutionary history. It is the essence of what makes us Human.

Human beings progress by telling stories. One event can result in a great variety of stories being told about it. Sometimes those stories differ greatly. Which stories are picked up and repeated and which ones are dropped and forgotten often determines how we progress. Our history, knowledge and understanding are all the collections of the few stories that survive. This includes the stories that we tell each other about the future. And how the future will turn out depends partly, possibly largely, on which stories we collectively choose to believe.

Some stories are designed to spread fear and concern. This is because some story-tellers feel that there is a need to raise some tensions. Some stories are frightening, they are like totemic warnings : "Fail to act now and we are all doomed." Then there are stories that indicate that all will be fine so long as we leave everything upto a few especially able adults. Currently, this trend is being led by those who call themselves "rational optimists". They tend to claim that it is human nature to compete and to succeed and also to profit at the expense of others. The rational optimists however, do not realize how humanity has progressed overtime through amiable social networks and how large groups work in less selfishness and in the process accommodate rich and poor, high and low alike. This aspect in story-telling is considered by the 'Practical Possibles', who sit between those who say all is fine and cheerful and be individualistic in your approach to a successful future, and those who ordain pessimism and fear that we are doomed. **[June-2015]**

What the future holds for us is which stories we hold on to and how we act on them.

116. Our knowledge is a collection of:
- (a) all stories that we have heard during our life-time
- (b) some stories that we remember
- (c) a few stories that survive
- (d) some important stories

117. Story telling is:
- (a) an art
- (b) a science
- (c) in our genes
- (d) the essence of what makes us human

118. How the future will turn out to be, depends upon the stories?
- (a) We collectively choose to believe in
- (b) Which are repeatedly narrated
- (c) Designed to spread fear and tension
- (d) Designed to make prophecy

119. Rational optimists :
- (a) look for opportunities.
- (b) are sensible and cheerful.
- (c) are selfishly driven.

Identify the correct answer from the codes given below:
- (a) (a), (b) and (c) (b) (A) only
- (c) (A) and (B) only (d) (B) and (C) only

120. Humans become less selfish when :
- (a) they work in large groups
- (b) they listen to frightening stories
- (c) they listen to cheerful stories
- (d) they work in solitude

121. 'Practical Possibles' are the ones who :
- (a) follow Midway Path (b) are doom-mongers
- (c) are self-centred (d) are cheerful and carefree

PASSAGE - 23

I did that thing recently where you have to sign a big card - which is a horror unto itself, especially as the keeper of the Big Card was leaning over me at the time. Suddenly I was on the spot, a rabbit in the headlights, torn between doing a fun message or some sort of in-joke or a drawing. Instead overwhelmed by the myriad options available to me, I decided to just write : "Good luck, best, Joel".

It was then that I realised, to my horror, that I had forgotten how to write. My entire existence is "tap letters into computer". My shopping lists are hidden in the notes function of my phone. If I need to remember something I send an e-mail to myself. A pen is something I chew when I'm struggling to think. Paper is something I pile beneath my laptop to make it a more comfortable height for me to type on.

A poll of 1,000 teens by the stationers, Bic found that one in 10 don't own a pen, a third have never written a letter, and half of 13 to 19 years - old have never been forced to sit down and write a thank you letter. More than 80% have never written a love letter, 56% don't have letter paper at home. And a quarter have never known the unique torture of writing a birthday card. The most a teen ever has to use a pen is on an exam paper.

Bic, have you heard of mobile phones ? Have you heard of e-mail, facebook and snap chatting ? This is the future. Pens are dead. Paper is dead. Handwriting is a relic.

"Handwriting is one of the most creative outlets we have and should be given the same importance as other art forms such as sketching, painting or photography." **[December-2015]**

122. When confronted with signing a big card, the author felt like "a rabbit in the headlight". What does this phrase mean?
- (a) A state of confusion
- (b) A state of pleasure
- (c) A state of anxiety
- (d) A state of pain

123. According to the author, which one is not the most creative outlet of pursuit ?
- (a) Handwriting (b) Photography
- (c) Sketching (d) Reading

124. The entire existence of the author revolves round :
- (a) Computer
- (b) Mobile phone
- (c) Typewriter

Identify the correct answer from the codes given below:
- (a) (B) only (b) (A) and (B) only
- (c) (A), (B) and (C) (d) (B) and (C) only

125. How many teens, as per the Bic survey, do not own a pen?
- (a) 800 (b) 560
- (c) 500 (d) 100

126. What is the main concern of the author ?
- (a) That the teens use social networks for communication.
- (b) That the teens use mobile phones.
- (c) That the teens use computer.
- (d) That the teens have forgotten the art of handwriting.

PASSAGE - 24

In terms of labour, for decades the relatively low cost and high quality of Japanese workers conferred considerable competitive advantage across numerous durable goods and consumer electronics industries (e.g. Machinery, automobiles, televisions, radios). Then labour-based advantages shifted to South Korea, then to Malaysia, Mexico and other nations. Today, China appears to be capitalizing best on the basis of labour. Japanese firms still remain competitive in markets for such durable goods, electronics and other products, but the labour force is no longer sufficient for competitive advantage over manufacturers in other industrializing nations. Such shifting of labour-based advantage is clearly not limited to manufacturing industries. Today, a huge number of IT and service jobs are moving from Europe and North America to India, Singapore, and like countries with relatively well-educated, low-cost workforces possessing technical skills. However, as educational levels and technical skills continue to rise in other countries, India, Singapore, and like nations enjoying labour-based competitive advantage today are likely to find such advantage cannot be sustained through emergence of new competitors.

In terms of capital, for centuries the days of gold coins and later even paper money restricted financial flows. Subsequently regional concentrations were formed where large banks, industries and markets coalesced. But today capital flows internationally at rapid speed. Global commerce no longer requires regional interactions among business players. Regional capital concentrations in places such as New York, London and Tokyo still persist, of course, but the capital concentrated there is no longer sufficient for competitive advantage over other capitalists distributed worldwide. Only if an organization is able to combine, integrate and apply its resources (eg. Land, labour, capital, IT) in an effective manner that is not readily imitable by competitors can such an organization enjoy competitive advantage sustainable overtime.

In a knowledge-based theory of the firm, this idea is extended to view organizational knowledge as a resource with atleast the same level of power and importance as the traditional economic inputs. (An organization with superior knowledge can achieve competitive advantage in markets that appreciate the application of such knowledge) Semiconductors, genetic engineering, pharmaceuticals, software, military warfare, and like knowledge-intensive competitive arenas provide both time-proven and current examples. Consider semiconductors (e.g. computer chips), which are made principally of sand and common metals. These ubiquitous and powerful electronic devices are designed within common office buildings, using commercially available tools, and fabricated within factories in many industrialized nations. Hence, land is not the key competitive resource in the semiconductor industry. **[July-2016]**

127. What is required to ensure competitive advantages in specific markets ?
- (a) Access to capital
- (b) Common office buildings
- (c) Superior knowledge
- (d) Common metals

128. The passage also mentions about the trend of
- (a) Global financial flow
- (b) Absence of competition in manufacturing industry
- (c) Regionalisation of capitalists
- (d) Organizational incompatibility

129. What does the author lay stress on in the passage?
- (a) International commerce
- (b) Labour-Intensive industries
- (c) Capital resource management
- (d) Knowledge-driven competitive advantage

130. Which country enjoyed competitive advantages in automobile industry for decades?
- (a) South Korea (b) Japan
- (c) Mexico (d) Malaysia

131. Why labour-based competitive advantages of India and Singapore cannot be sustained in IT and service sectors?
- (a) Due to diminishing levels of skill.
- (b) Due to capital-intensive technology making inroads.
- (c) Because of new competitors.
- (d) Because of shifting of labour-based advantage in manufacturing industries.

132. How can an organisation enjoy competitive advantage sustainable overtime ?
- (a) Through regional capital flows.
- (b) Through regional interactions among business players.
- (c) By making large banks, industries and markets coalesced.
- (d) By effective use of various instrumentalities.

PASSAGE - 25

Many aspects of the motion-picture industry and its constituent companies are dissimilar to those observable in advanced-technology industries and firms.

For instance, company longevity does not represent a consistent concern across the two organisational contexts. In the advanced-technology company for example, one new-product innovation – which is expected to generate financial returns to the firm – is insufficient for the company to be successful.

Rather, a stream of new product innovations is required. By contrast with the independent production company of this case, each new film – which is expected to generate financial returns to the principals – is sufficient for the company to be successful. Any subsequent new films involving the firm's participants will be produced by a different independent company.

As another instance, people's learning is expected to have different contributors and beneficiaries across the two organizational contexts. In the advanced-technology company, for example, each new product innovation provides an opportunity for participants on the project team to learn and acquire experience, and this same company intends to retain such participants, hence, benefit from their increased experience on the next project. By contrast with the independent production company, each new film provides an opportunity for participants on the project team to learn and acquire this experience also, but this same company has little or no expectation of retaining such participants, and hence, benefitting from their increased experience in the next project.

Experience is paramount in the motion-picture industry. Generally, on film projects, budgets are very tight, and schedules are very

demanding. People are hired largely based on their experience and are expected to perform well immediately when called to do so. There is negligible slack time or margin for learning through trial and error, but experienced people learn exactly through trial and error. Because experience is valued so highly and film-production houses have such short time horizons, entry into the industry is very difficult for most people. Further, the role played by schools and colleges is minimal in this industry. Some skills and techniques can be learned and refined through formal education (e.g., acting schools, theatre, film degrees), but the majority come through direct experience. Mentoring plays an important role. True, the film business focuses heavily on exploitation over exploration. Yet success of the industry as a whole is critically dependent upon learning and exploration overtime. **[August-2016]**

133. What is not a consistent concern across the two organisational contexts?
(a) Dissimilarity (b) Product package
(c) Financial return (d) Company longevity

134. What will be sufficient for an independent production company to be successful?
(a) New product innovations
(b) Financial returns from each new film
(c) Active role by firm's participants
(d) Organizational context

135. What does an advanced-technology company expect from the learning experience of its participants?
(a) Benefit for the next project
(b) Opportunity for more learning
(c) Little expectation of retaining them
(d) Help in marketing the previous product

136. What is not the expectation of an independent production company in the case of its participants?
(a) Absence from the next project
(b) Retention for the next project
(c) Participation in the current project
(d) Use of opportunity to acquire experience

137. Why do film production houses value experience highly?
(a) Because of the importance of trial and error methods
(b) Because of the margin for learning
(c) Because of short time horizons
(d) Because it allows easy entry to everyone into the film world

138. According to the author, what has been the focus of film business?
(a) Formal education (b) Mentoring
(c) Exploitation (d) Indirect experience

PASSAGE - 26

The last great war, which nearly shook the foundations of the modern world, had little impact on Indian literature beyond aggravating the popular revulsion against violence and adding to the growing disillusionment with the 'humane pretensions' of the Western World. This was eloquently voiced in Tagore's later poems and his last testament, Crisis in Civilisation. The Indian intelligentsia was in a state of moral dilemma. On the one hand, it could not help sympathising with England's dogged courage in the hour of peril, with the Russians fighting with their backs to the wall against the ruthless Nazi hordes, and with China groaning under the heel of Japanese militarism; on the other hand, their own country was practically under military occupation of their own soil, and an Indian army under Subhas Bose was trying from the opposite camp to liberate their country. No creative impulse could issue from such confusion of loyalties. One would imagine that the achievement of Indian independence in 1947, which came in the wake of the Allies' victory and was followed by the collapse of colonialism in the neighbouring countries of South-East Asia, would have released an upsurge of creative energy. No doubt it did, but unfortunately it was soon submerged in the great agony of partition, with its inhuman slaughter of the innocents and the uprooting of millions of people from their homeland, followed by the martyrdom of Mahatma Gandhi. These tragedies, along with Pakistan's invasion of Kashmir and its later atrocities in Bangladesh, did indeed provoke a poignant writing, particularly in the languages of the regions most affected, Bengali, Hindi, Kashmiri, Punjabi, Sindhi and Urdu. But poignant or passionate writing does not by itself make great literature. What reserves of enthusiasm and confidence survived these disasters have been mainly absorbed in the task of national reconstruction and economic development. Great literature has always emerged out of chains of convulsions. Indian literature is richer today in volume, range and variety than it ever was in the past. **[January-2017]**

139. What was the impact of the last great war on Indian literature?
(a) It had no impact.
(b) It aggravated popular revulsion against violence.
(c) It shook the foundations of literature.
(d) It offered eloquent support to the Western World.

140. What did Tagore articulate in his last testament?
(a) Offered support to Subhas Bose.
(b) Exposed the humane pretensions of the Western World.
(c) Expressed loyalty to England.
(d) Encouraged the liberation of countries.

141. What was the stance of Indian intelligentsia during the period of great war?
(a) Indifference to Russia's plight.
(b) They favoured Japanese militarism.
(c) They prompted creativity out of confused loyalties.
(d) They expressed sympathy for England's dogged courage.

142. Identify the factor responsible for the submergence of creative energy in Indian literature.
(a) Military occupation of one's own soil.
(b) Resistance to colonial occupation.
(c) Great agony of partition.
(d) Victory of Allies.

143. What was the aftermath that survived tragedies in Kashmir and Bangladesh ?
(a) Suspicion of other countries
(b) Continuance of rivalry
(c) Menace of war
(d) National reconstruction

144. The passage has the message that
(a) Disasters are inevitable.
(b) Great literature emerges out of chains of convulsions.
(c) Indian literature does not have a marked landscape.
(d) Literature has no relation with war and independence.

PASSAGE - 27

Climate change is considered to be one of the most serious threats to sustainable develop-ment, with adverse impacts on the environment, human health, food security, economic activity, natural resources and physical infrastructure. Global climate varies naturally. According to the Inter- governmental Panel on Climate Change (IPCC), the effects of climate change have already been observed, and scientific findings indicate that precautionary and prompt action is necessary. Vulnerability to climate change is not just a function of geography or dependence on natural resources; it also has social, economic and political dimensions which influence how climate change affects different groups. Poor people rarely have insurance to cover loss of property due to natural calamities i.e. drought, floods, super cyclones etc. The poor communities are already struggling to cope with the existing challenges of poverty and climate variability and climate change could push many beyond their ability to cope or even survive. It is vital that these communities are helped to adapt to the changing dynamics of nature. Adaptation is a process through which societies make themselves better able to cope with an uncertain future. Adapting to climate change entails taking the right measures to reduce the negative effects of climate change (or exploit the positive ones) by making the appropriate adjustments and changes. These range from technological options such as increased sea defences or flood - proof houses on stilts to behavioural change at the individual level, such as reducing water use in times of drought. Other strategies include early warning systems for extreme events, better water management, improved risk management, various insurance options and biodiversity conservation. Because of the speed at which climate change is happening due to global temperature rise, it is urgent that the vulnerability of developing countries to climate change is reduced and their capacity to adapt is increased and national adaptation plans are implemented. Adapting to climate change will entail adjustments and changes at every level from community to national and international. Communities must build their resilience, including adopting appropriate technologies while making the most of traditional knowledge, and diversifying their livelihoods to cope with current and future climate stress. Local coping strategies and knowledge need to be used in synergy with government and local interventions. The need of adaptation interventions depends on national circumstances. There is a large body of knowledge and experience within local communities on coping with climatic variability and extreme weather events. Local communities have always aimed to adapt to variations in their climate. To do so, they have made preparations based on their resources and their knowledge accumulated through experience of past weather patterns. This includes times when they have also been forced to react to and recover from extreme events, such as floods, drought and hurricanes. Local coping strategies are an important element of planning for adaptation. Climate change is leading communities to experience climatic extremes more frequently, as well as new climate conditions and extremes. Traditional knowledge can help to provide efficient, appropriate and time - tested ways of advising and enabling adaptation to climate change in communities who are feeling the effects of climate changes due to global warming. **[November-2017]**

145. Given below are the factors of vulnerability of poor people to climate change. Select the code that contains the correct answer.
(a) Their dependence on natural resources
(b) Geographical attributes
(c) Lack of financial resources
(d) Lack of traditional knowledge
Code :
(a) (A), (B) and (C) (b) (B), (C) and (D)
(c) (A), (B), (C) and (D) (d) (C) only

146. Adaptation as a process enables societies to cope with :
(a) An uncertain future
(b) Adjustments and changes
(c) Negative impact of climate change
(d) Positive impact of climate change
Select the most appropriate answer from the following code :
(a) (A), (B), (C) and (D) (b) (A) and (C)
(c) (B), (C) and (D) (d) (C) only

147. To address the challenge of climate change, developing countries urgently require :
(a) Imposition of climate change tax
(b) Implementation of national adaptation policy at their level
(c) Adoption of short-term plans
(d) Adoption of technological solutions

148. The traditional knowledge should be used through :
(a) Its dissemination
(b) Improvement in national circumstances
(c) Synergy between government and local interventions
(d) Modern technology

149. The main focus of the passage is on :
(a) Combining traditional knowledge with appropriate technology
(b) Co-ordination between regional and national efforts
(c) Adaptation to climate change
(d) Social dimensions of climate change

PASSAGE - 28

If India has to develop her internal strengths, the nation has to focus on the technological imperatives, keeping in mind three dynamic dimensions : the people, the overall economy and the strategic interests. These technological imperatives also take into account a 'fourth' dimension, time, an offshoot of modern day dynamism in business, trade, and technology that leads to continually shifting targets. We believe that technological strengths are especially crucial in dealing with this fourth dimension underlying continuous change in the aspirations of the people, the economy in the global context, and the strategic interests. The progress of technology lies at the heart of human history. Technological strengths are the key to creating more productive employment in an increasingly competitive market place and to continually upgrade human skills. Without a pervasive use of technologies, we cannot achieve overall development of our people in the years to come. The direct linkages of technology to the nation's strategic strengths are becoming more and more clear, especially since 1990s. India's own strength in a number

of core areas still puts it in a position of reasonable strength in geo-political context. Any nation aspiring to become a developed one needs to have strengths in various strategic technologies and also the ability to continually upgrade them through its own creative strengths. For people-oriented actions as well, whether for the creation of large scale productive employment or for ensuring nutritional and health security for people, or for better living conditions, technology is the only vital input. The absence of greater technological impetus could lead to lower productivity and wastage of precious natural resources. Activities with low productivity or low value addition, in the final analysis hurt the poorest most. The technological imperatives to lift our people to a new life, and to a life they are entitled to is important. India, aspiring to become a major economic power in terms of trade and increase in GDP, cannot succeed on the strength of turnkey projects designed and built abroad or only through large-scale imports of plant machinery, equipment and know how. Even while being alive to the short-term realities, medium and long-term strategies to develop core technological strengths within our industry are vital for envisioning a developed India.

[July-2018]

150. According to the above passage, which of the following are indicative of the fourth dimension ?
(a) Aspirations of people
(b) Modern day dynamism
(c) Economy in the global context
(d) Strategic interests

Code:
(a) (a), (b) and (c) only (b) (b), (c) and (d) only
(c) (a), (c) and (d) only (d) (a), (b) and (d) only

151. More productive employment demands :
(a) Pervasive use of technology
(b) Limiting competitive market place
(c) Geo-political considerations
(d) Large industries

152. Absence of technology would lead to :
(a) Less pollution
(b) Wastage of precious natural resources
(c) Low value addition
(d) Hurting the poorest most

Code :
(a) (a), (b) and (c) only (b) (b), (c) and (d) only
(c) (a), (b) and (d) only (d) (a), (c) and (d) only

153. The advantage of technological inputs would result in :
(a) Unbridled technological growth
(b) Importing plant machinery
(c) Sidelining environmental issues
(d) Lifting our people to a life of dignity

154. Envisioning a developed India requires :
(a) Aspiration to become a major economic player
(b) Dependence upon projects designed abroad
(c) Focus on short-term projects
(d) Development of core technological strengths

PASSAGE - 29

We live in a world characterised by greater universal aspirations to full participation in the life of societies. What is more, in every society there is a constantly growing need to take full advantage of its reserves of intelligence, talent and energy. Here the need to improve the quality of education is emphasised. Clearly, any assessment of quality involves a value judgement that is coloured by what one expects of education. A good-quality education should meet three essential criteria : it should be democratic, it should be socially effective and it should be motivated by a humanism that does not allow it to be subordinated exclusively to the criterion of productivity. This calls for a critical appraisal of the highly debatable tendency to give priority to allegedly "practical" knowledge as opposed to mind-broadening subjects, topics for thought, artistic expression or the philosophical approach. The link between education and work formed another theme which was frequently brought up. There is a grave concern regarding the wide discrepancies between education and employment. UNESCO, for a long time now, has made a point of studying the interactions between education, work and employment as part of its action in the field of planning. It has to be said that it is very difficult to plan education strictly in accordance with employment forecasts, in view of the growing diversity of modern economies and the extremely rapid changes to which they are subject. It has been shown that greater flexibility in the structures and functioning of education provides the best guarantee against the danger that it will be ill-adapted to rapid change. **[December-2018]**

155. The passage emphasises the factors of:
(a) Need for quality education
(b) Link between education and work
(c) Balance between mind-broadening subjects with practical knowledge
(d) Not planning education for meeting the needs of modern economies
(E) Flexibility in the structures of education
(F) Subjecting education to rapid changes
(a) (A), (D), (E), (F) (b) (A), (C), (D), (F)
(c) (A), (B), (C), (E) (d) (B), (D), (E), (F)

156. The characteristic of humanism should be
(a) Priority to practical knowledge
(b) Opposition to philosophical approach
(c) Planning education for employment
(d) Non-sub-ordination to productivity notion

157. What is the action of UNESCO in the field of planning?
(a) Not to plan education for work
(b) To study the linkage between education and work
(c) Expressing grave concern on discrepancies between education and life
(d) Focussing on artistic expression

158. What is coloured by the expectation of education?
(a) A critical appraisal of debatable tendencies
(b) Value judgement
(c) Identification of motivation
(d) Assessment of expect outcome

159. Why is there a need in every society to take advantage of intelligence, talent and energy?
(a) To characterise the world with universal aspirations
(b) To preserve the reserves of these factors cited
(c) To assess the educational needs
(d) To participate in the life of societies

PASSAGE - 30

There is a common thread running through the unravelling of India's statistical system. A modern economy with sound institutions is characterized by timely dissemination of credible data. A long term policy needs an empirical basis and issues of veracity of data will influence investment decisions. In a country with a large population of youth, data on national development, especially in core sectors like agriculture, industry, health, education and employment, will be critical. Here comes the role of National Statistical Commission, a body created to establish standards. Questioning the data veracity is a global phenomenon. The official narrative is always questioned by the people on the other side of the fence. Dissemination of economic data is essential to reach out to the public who lived their reality. Lack of data will adversely impact the quality of national policies. India must start strengthening institutions such as the central statistical commission. These institutions must be granted autonomy and insulated from external interferences. Enhanced operational autonomy will make their work credible. An indicator of operational autonomy is their ability to stick to a dissemination calendar regardless of what the data indicates.

[20th June 2019 (First Shift)]

160. What is important for a modern economy?
- (a) A common thread
- (b) Dissemination of credible data
- (c) Unravelling of statistical system
- (d) Selective Distribution of Data

161. What is the work of National Statistical Commission?
- (a) Establishing Standards
- (b) Questioning Data Veracity
- (c) Questioning Official Narrative
- (d) Supporting the Public Perception

162. What does the passage ultimately suggest to National Statistical Commission?
- (a) Restricting policy decisions
- (b) Critically examining data veracity
- (c) Stick to a calendar of data dissemination
- (d) Support development in core sectors

163. Investment decision are impacted by:
- (a) Youth Population
- (b) National Development
- (c) Issues of Data Veracity
- (d) Establishment of National Institutes

164. How can the quality of national policies be improved?
- (a) By living reality
- (b) By supporting external interferences
- (c) By controlling autonomous institutions
- (d) By enhanced operational freedom

PASSAGE - 31

Perhaps what bothered the media in 1970s was the shift in liberty being suggested For centuries, journalists had operated on the basis of negative liberty, or freedom from external restraints. Suddenly, however, the thrust was positive freedom, a freedom for pursuit of some predetermined goals. This new social responsibility seems grounded on a school of thought that sees negative liberty as insufficient and ineffective, somewhat like telling people they are free to walk without first making sure they are not cripple(d) Who better than government is able to provide humanity with appropriate means? Government, even a democratic government, is seen by social responsibility adherents as the only force strong enough to guarantee effective operation of freedom This does not mollify observers who find social responsibility to be only slightly disguised version of authoritarianism. Media philosopher John Merrill has been one of the most outspoken critics of the theory. To him, the proposition that pluralism of ideas should be governmentally mandated is ludicrous. Journalists, he says, must retain their freedom to make their own news and editorial judgements. Even well-intentioned attempts by outside groups seeking media improvement are self-serving, and inevitably lessen the autonomy of journalists, Merrill maintains. This leads us to the issue of media autonomy. **[20th June 2019 (Second Shift)]**

165. What was the basis of the operation of journalists earlier?
- (a) Freedom of limited choices
- (b) Social responsibility
- (c) Free from outside pressure
- (d) Government control

166. According to John Merrill, seeking improvement in media, is:
- (a) Appropriate
- (b) Well-intentioned
- (c) Inevitable
- (d) Self-serving

167. The passage critically analyses:
- (a) Operation of journalists.
- (b) Mandate for government.
- (c) Social responsibility theory of media
- (d) Regimented autonomy of journalists.

168. Some scholars consider social responsibility aspect of media as:
- (a) Negative freedom
- (b) Pluralism
- (c) Democratization of media
- (d) Authoritarianism

169. Positive freedom means:
- (a) Grounded thought
- (b) Pursuing certain set goals
- (c) Freedom with conditions
- (d) Providing identified means

PASSAGE - 32

Unquestionably a literary life is for the most part an unhappy life, because if you have genius, you must suffer the penalty of genius; and if you have only talent, there are so many cares and worries incidental to the circumstances of men of letters, as to make life exceedingly miserable. Besides the pangs of composition, and the continuous disappointment which a true artist feels at his inability to reveal himself, there is the ever – recurring difficulty of gaining the public ear. Young writers are buoyed up by the hope and the belief that they have only to throw that poem at the world's feet to get back in return the laurel-crown; that they have only to push as a new light in literature. You can never convince a young author that the editors of magazines and the publishers of books are a practical body of men, who are by no means frantically anxious about placing the best literature before the public. Nay, that for the most part they are mere brokers, who conduct their business

on the hardest lines of a profit and loss account. But supposing your book fairly launches, its perils are only beginning. You have to run the gauntlet of the critics. When you are a little older, you feel find that criticism is not much more serious than the bye-play of clowns in a circus, when they best around the ring, the victim with bladders stung at the end of long poles. A time comes in the life of every author when he regards critics as comical rather than formidable, and goes his way unheeding. But there are sensitive souls that yield under the chastisement and, perhaps after suffering much silent torture, abandon the profession of the pen forever.

[21st June 2019 (First Shift)]

170. Young authors aspire to:
- (a) Equate themselves to the established authors.
- (b) Remain content in their work only.
- (c) Achieve glory by their merit yet always in a hurry.
- (d) Become critics subsequently.

171. Experience and age of an author:
- (a) Makes the author stoic to criticism
- (b) Makes the author angry and lovely
- (c) Turns the author to a buffoon
- (d) Drives the author to cynicism

172. Literary life is unhappy because:
- (a) One has to carry the load of being a genius while not being one.
- (b) The genius can still remain a genius and be amidst misery in the face of adversity.
- (c) Talent brings pseudo happiness.
- (d) There is a constant desire to outshine others.

173. The perception towards the publishers and critics in the above passage is:
- (a) That of a scathing attack
- (b) That of sympathy
- (c) That of generosity
- (d) That of cynicism

174. The effective way of tackling criticism is:
- (a) To defend oneself through print media.
- (b) To be vocal about one's craft.
- (c) To become a critic of one's own art and start analysing its merit.
- (d) To be gracefully glued to the artistic exercise.

PASSAGE - 33

All great thinkers live and move on a high plane of thought. It is only there they can breathe freely. it is only in contact with spirits like themselves they can live harmoniously and attain that serenity which comes from ideal companionship. The studies of all great thinkers must range along the highest altitudes of human thought. I have always thought that the strongest argument in favour of the Bconian theory was, that no man, however indubitable his genius, could have written the plays and sonnets that have come down to us under Shakespeare's own name who had not the liberal education of Bacon. The magnificent ideals that have ever haunted the human mind and given us our highest proofs of a future immortality by reason of the impossibility of their fulfilment here, are splintered into atoms by contact with life's realities. Hence comes our subline discontent. A habitual meditation on the vast problems that underline human life and are knit into human destinies – thoughts of immortality, of the littleness of mere man, of the greatness of man's soul, of the splendours of the universe that are invisible to the ordinary traffckers in the street, as the vastness of St. Peter's is to the spider that weaves her web in a corner of the dome–those things do not fit men to understand the average human being, or tolerate with patience the sordid wretchedness of the unregenerated masses. It is easy to understand, therefore, why such thinkers fly to the solitude of their own thoughts, or the silent companionship of the immortals and if they care to present their views in prose or verse to the world, that these views take a sombre and melancholy setting from "the pale caste of thought" in which they were engendered.

[21st June 2019 (Second Shift)]

175. Great thinkers are content to live
- (a) amidst crises of civilisation
- (b) in lofty thoughts with an exceptional calm
- (c) at high attitudes in order to be away from society
- (d) with complexities of life and find solutions to them

176. Baconian liberal education is
- (a) A lofty and ideal fantasy
- (b) Instrumental in making human beings rue over their destiny
- (c) An engagement with the intricacies of the day to day life
- (d) Equivalent to ancient ideas of sublimity

177. Why do great thinkers love solitude?
- (a) To be in pursuit of the ideal in the company of immortals
- (b) To spend time in peace
- (c) Because they are misanthropists
- (d) Because the world is unhealthy for them

178. According to the passage, our sublime discontent is due to
- (a) Realization of our lack of contact with God
- (b) Acute sense of loneliness in a hostile world
- (c) Possibility of immortality through some channels to god and the inability to get hold of it
- (d) The contrast between the ideals in great literature and their opposite in the real life

179. Immortality is the crucial idea constantly being explained by
- (a) ordinary traffickers
- (b) great thinkers
- (c) gods who appear to these thinkers
- (d) scientists

PASSAGE - 34

Michelangelo is famous for having successfully interpreted the human body. His great achievement is that of the painting of David whose hands reach out as a sign of human body. His great achievement is that of the painting of David whose hands reach out as a sign of human capability and potential. It is assumed that the time he lived was ripe for exchange of knowledge, development in science and matured enough to advance the horizon of investigation in all fields. Renaissance humanism stressed on a serious rethink on the nature of art that focussed on accurate details. In painting and sculpture, artists focussed on not so casual but verifiable and minute details. Michelangelo's

paintings are no exception to it. In a study published in the journal of the Royal Society of medicine, a group of surgeons are of the opinion that the great master was "afflicted by an illness involving his joints". They have used his portraits as evidence to argue their view. During his life, he complained of what he felt to be 'gout'. Later he complained of his sore and stiff hands which the doctors would find to be natural for someone who was engaged in handmade art. The doctors found corroboration of those claims in portraits of the artist that show a hanging left hand with both degenerative and non-degenerative changes. They attribute the pain not just to arthritis, but to the stress of hammering and chiselling and note that though the master was seen hammering days before his death at an old age, he did not write or sign his own letters before his death. In recent times there have been attempts to diagnose famous artists with diseases that were not known during their time. This practice has raised many questions, especially on the issue of ethics in research. It is also inferred from authentic analysis that Michelangelo persisted in his work until his last days. This theory would emphasize that his artistic subject defied his physical infirmities.

[24th June 2019 (First Shift)]

180. What generalisation do people subscribe to?
- (a) Establishing facts by DNA tests.
- (b) Inferring the essence of character from famous people's handwriting.
- (c) Carbon dating of the hair of celebrities to draw conclusion on their physical structure.
- (d) To retroactively diagnose famous artists and public figures of conditions that were not prevalent during their time.

181. Renaissance painting in Europe was sceptical of:
- (a) The obsessive medieval method of accuracy.
- (b) The classical simplicity and lack of control.
- (c) The case and decorative excess of earlier art.
- (d) Expressionist technique.

182. The controversy that the passage above refers to is whether:
- (a) Michelangelo worked under duress.
- (b) Michelangelo could contain his physical infirmity by artistic excellence.
- (c) Michelangelo submitted to disease.
- (d) Michelangelo survived different diseases before pursing art.

183. Michelangelo lived during a time that lets us know that:
- (a) Human aspirations are limitless and open to new vistas of knowledge.
- (b) Cross cultural exchange in ideas is the only way for human progress.
- (c) It is progress of science and anatomy that contributes to civilizations exclusively.
- (d) Human beings possess language which is the only key to knowledge.

184. What actually may be concluded from the above passage?
- (a) Physical infirmities do dissuade people with capabilities from excelling.
- (b) Excellence in any form triumphs over extraneous factors including physical ailments.
- (c) Michelangelo's gout and other ailments lessened his efficiency.
- (d) The diseases Michelangelo faced were due to constant hammering.

PASSAGE - 35

A business will usually go through a clear set of stages that will make up its organisational life cycle. These stages include introduction, early growth, continuous growth, maturity and decline. The first stage, the introduction state, is the start-up phase where a business decides what its core strengths and capabilities are and starts selling its product or service. At this early stage, the founder or founders will be a part of every aspect of the daily process of the business. The main goal at this stage is to take off to a good start and make a place in the market.

The next stage, the early growth phase, aims at increased sales and more development. The focus at this stage remains on the original product or service but the effort is to increase the market share and venture into related products or services. The main goal is to move the founder to a more managerial role so more time is spent on managing and building the business. At this stage, documents and policies need to be developed so any member of the organisation can see the business any time.

The third stage, the continuous growth stage, requires a systematic structure and more formal relationships among its participants. At this stage, the resource requirements of the business need careful handling. The focus is on the expansion of the business, keeping in mind its core strength and capability. A formal organisational structure and a clear delegation plan are important at this stage.

At the fourth stage of maturity, a business often slows down as the level of innovative energy may have become weak and the formal structures may have become obstacles. A lot of care is required to prevent decline. **[24th June 2019 (Second Shift)]**

185. The resource requirements of a business need careful handling at which stage?
- (a) Fourth
- (b) First
- (c) Third
- (d) Second

186. Venturing into related products and services does not mean that a business will:
- (a) ignore the original product
- (b) move the founder to a more managerial role
- (c) delegate more responsibilities
- (d) ignore the related products and services

187. The founder of a business does not move to a more managerial role at which stage?
- (a) Early growth stage
- (b) Maturity stage
- (c) Decline stage
- (d) Start up stage

188. The slowing down of a business can happen if:
- (a) there is a decline in the market share
- (b) the level of innovative energy weakens
- (c) the managerial roles are not clear
- (d) the level of investment declines

189. When will a business create its place in the market?
- (a) At maturity
- (b) At introduction
- (c) At early growth
- (d) At late growth

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PASSAGE - 36

Intelligence is associated with academic achievement by most people. The various theories of intelligence created by psychologists hold that there are two kinds of academic intelligence-verbal and mathematical or logical. Intelligence is an inherited trait that impacts individual behaviour and performance according to most experts. But, many research studies have revealed that the environment greatly impacts the development of intelligence. Since, one property of intelligence is analytical and reasoning skills, people with high intelligence quotient will understand the problem at hand better than people with a low IQ.

Many organizations consider intelligence as an important criterion while recruiting. For instance in many management schools, a lot of weightage is given to high IQ while admitting students or recruiting faculty members. The qualities of intelligent people are high energy drive, achievement and competitiveness. Very intelligent employees learn job – related skills and other organisational practices quickly and organisations have to spend less time training them. People with high intelligence have good decision making ability due to their good analytical and reasoning skills. With a high achievement drive, they are mostly very productive. As the saying goes, 'A wise enemy is better than a foolish' friend;

Even with such a high IQ, very intelligent people may not always be very happy. The high IQ makes them dysfunctional leading to anxiety and depression. Generally speaking, people with high intelligence quotient are often dissatisfied people.

[25th June 2019 (First Shift)]

190. When a student stands first in the class, the general credit is given to:
(a) Contacts (b) Intelligence
(c) Hard work (d) Attractive features

191. Dissatisfaction is often witnessed in people with
(a) Creative skills
(b) High expectations
(c) Good decision – making ability
(d) High education qualifications

192. High energy drive, achievements and competitiveness are valued during
(a) Admission
(b) Recruitment
(c) Promotion
(d) Admission and recruitment

193. Those who understand a problem in a short span of time will be people with
(a) High IQ (b) Low IQ
(c) Average IQ (d) Good IQ

194. Another word for 'Weightage' is
(a) Credit (b) Mass
(c) Weight (d) Freedom

PASSAGE - 37

Indian organisations have traditionally not considered their human resource as a means of distinct competitive advantage. Rather, people management has been a big challenge for the Indian business head. this situation is undergoing rapid change today; because as Indian organisations are recognising the need for professional human resource management, simultaneously there is a growing demand for trained human resource professionals. At most universities, business schools have begun to offer specialised, customised courses to train the human resource professional. Increasingly, organisations are encouraging line managers to handle human resource responsibilities.

Ancient India was known for its occupation based hierarchy. The ancient Indian text, the Arthashastra refers to the job description of a supervisor and performance linked pay for artisans.

It was only after the 1850 that formal industrial organisations emerged in India. But it was only after India became an independent country in 1947 that significant improvement was witnessed in the personnel management policy of business organisations.

After independence, when a mixed economy was encouraged as the Indian growth model, industrial organisations were broadly classified into public sector and private sector. Since the public sector units were the recipients of large investments and became the biggest employers, their approach towards personnel management receive a lot of attention. The goal of a socialistic society enshrined within the constitution of India implied that the protection of human resource became a significant objective. Many constitutional provisions were created in order to protect workers. Organisations gad to appoint welfare officers to take care of all personnel.

The next phase of development saw the rise of the trade unions, and manager unions in the Indian business organization. this further boosted the growth of personnel offices in most organisations.

[25th June 2019 (Second Shift)]

195. More and more organisations are encouraging their line managers to handle
(a) the whole organisation
(b) the responsibilities of human resource
(c) the offices of juniors
(d) the public relations

196. The competitive advantages of human resource has NOT been
(a) understood in the past (b) realised in the present
(c) ignored in the past (d) planned for the future

197. Significant improvement was seen in the personnel management policy of business organisations after
(a) 1850 (b) 1857
(c) 1940 (d) 1947

198. Personnel offices in many organisations witnessed an increase because of
(a) independence of India (b) industrial development
(c) the rise of unions (d) worker-friendly policies

199. The hierachy system in ancient India was based on
(a) the job you did
(b) the family you belonged to
(c) the place you lived in
(d) the year of your birth

PASSAGE - 38

Geography seeks to understand the physical and human organization of the surface of the Earth. In the field of geography,

inter-related themes are frequently seen. These are scale, pattern and process. Scale is defined as the level of structure on organisation at which a phenomenon is studied. Pattern is defined as the variation observed in a phenomenon studied at a particular scale. The third theme, process, further connects the first two. Process is defined as the description of how the factors that affect a phenomenon act to product a pattern at a particular scale. For instance, when a passenger on an aircraft looks out of the window, the view changes according to the scale. At the global scale when the aircraft maintains its height, he can see the chunks of clouds in all their pattern, the sun or the moon, as per the time. When the aircraft loses a little height, passengers can see the land and water masses in their different colours and the shape of land masses. At the continental scale, the passengers can see the shapes of the land features and how they are distributed. The pattern emerges as the variation of land and water and the proportion of each. Looking carefully, passengers can note how each land mass aligns with the others and how each mountain bears the signs of the process through which it emerged.

The processes in a geography change in a regular and repetitive manner. One instance of this is the annual solar cycle of the sun and the earth. Most systems in nature display time cycles that are organised in a rhythm of their own. As these time cycles and natural processes are always active, the environment of the earth is always in a state of dynamism. This environmental change is not only the result of natural process but also the result of human activity. Physical geography works towards understanding the interaction between man and nature and also the results of this interaction in order to manage global climate change better.

[26th June 2019 (First Shift)]

200. The alignment of landmass with other elements can be seen by a passenger on a flight on a:
(a) Global scale (b) Continental scale
(c) Local scale (d) Time scale

201 Physical geography studies the results of the interaction between man and nature in order to
(a) understand global climate change
(b) study the impact of man's activities on nature
(c) address the issue of global climate change
(d) reduce man-animal conflict

202. The time cycles of the system of nature follow their own
(a) Path (b) Rhythm
(c) Process (d) Cycle

203. In geography, pattern studies the variation observed in a phenomenon at
(a) a particular scale (b) any scale
(c) every scale (d) most scales

204. The view seen by a passenger looking out of the window of an aircraft will be affected by the
(a) Process (b) Pattern
(c) Scale (d) Rhythm

PASSAGE - 39

An important difference between human beings and animals is the property of language . Animals have a rudimentary information process but this process does not have the sophistication and complexity of human language. If two does communicate, they pass on information but they can't discuses detail the way human can. While humans are blessed to possess the language faculty, most of the time they don't utilize it to its greatest potential. Perhaps this is because human beings tend to react rather than respond. And a lot of the message of languages is lost in this reaction.

In the daily use of the language, people forget the complex process involved in order to put even one word in place. The wonder of his process lies in the fact that it is involuntary in nature the whole set of chain process right from the command in the brain to forming of words from the message required to the movement of the vocal chards and corresponding movement in the lungs and mouth takes place within second. Perhaps the whole suggestion of 'think before you speak' may lead to a silent worlds!

In the world of daily interaction, language becomes a marker and means of projecting identity. The people around us identify us with a certain style of using language and unknowingly, each language user follows this style by habits. It is not a bad idea to record one's spoken communication from time to time, as this will assist in removing any unwanted elements that the speech may expressing . Similarly, it is a good idea to step back once in a white and road one's written communication objectively.

[26th June 2019 (Second Shift)]

205. Which of the following forms is assumed by the language style of a person?
(a) a reaction (b) a habit
(c) a response (d) a thought

206. Animals do not possess language because
(a) the power of speech is missing
(b) the life breath is missing
(c) the level of complexity is missing
(d) the information-sharing is missing

207. The world will become a silent place if people will think
(a) too much (b) before listening
(c) before responding (d) before speaking

208. The process of language is a wonder because it is
(a) a reaction (b) a response
(c) smooth (d) involuntary

209. When human beings react rather than respond
(a) They lose the message
(b) They lose control
(c) They become emotional
(d) They can't speak

PASSAGE - 40

Political 'representation' nonetheless is the vehicle that enabled the re-introduction of "democracy" into the modern, practical political vernacular. The resulting liberal democracy does not directly descend from the ancient Athenian democracy. Between the eras virtually nothing existed that approached "democracy" as an actual or named political form and when it again became a focus of politics and theory, it was wedded to representation — so that what we call a democracy is, in fact, a distinctive kind of democracy, "a representative democracy". While elections

and popular pressure surely have political impact, the actions of representatives are the primary, official mechanism for translating democratic citizenship into political power. We rely on the representative process to promote political goodness in democratic society, but when one imagines the idea of 'representation' these days, its association with ethics or goodness does not spring to mind. It is an impersonal process, after all— a mechanical method by which one entity stands for or re-presents another, politically required by the need to channel the judgements of millions of citizens into the legally authoritative hands of a small number of public representatives, or even the sentiments of thousands into the leadership of a single person. **[2nd Dec. 2019 (First Shift)]**

210. Which of the following implies the characteristic of modern political vernacular?
(a) Populist politics
(b) Absence of structure
(c) Ethical discourse
(d) Representiveness

211. The political representation enabled the emergence of
(a) Athenian democracy
(b) Liberal democracy
(c) Actual democracy
(d) Theoretical democracy

212. What is the perception of the author with regard to representational democracy?
(a) Legal as well as ethical
(b) Universal participation
(c) Arbitrarily authoritative
(d) Centralisation of power in a few individuals

213. According to the author, the idea of democracy is viewed as
(a) Ethical politics
(b) Goodness of representation
(c) A representative process
(d) Channelising views of a few people

214. According to the passage actions of political representatives manifest
(a) Political will
(b) Popular pressure
(c) Political power
(d) Self-effacing behaviours

PASSAGE - 41

Intra-industry trade arises in order to take advantage of important economies of scale in production. That is, international competition forces each firm or plant in industrial countries to produce only one, or at most a few, varieties and styles of the same product rather than many different varieties and styles. This is crucial in keeping unit costs low. With few varieties and styles, more specialised and faster machinery can be developed for a continuous operation and a longer production run. The nation then imports other varieties and styles from other nations. Intra-industry trade benefits consumers because of the wider range of choices. i.e., the greater variety of differentiated products, available at lower prices made possible by economies of scale in production. Because of this, large welfare gains arise from the ability of consumers to greatly increase the variety of goods that they can purchase through trade. The importance of intra-industry trade became apparent when tariffs and other obstructions to the flow of trade among members of the European Union or common market were removed in 1958. It was found that volume of trade surged but most of the increase involved the exchange of differentiated products within each broad industrial classification. **[2nd Dec. 2019 (Second Shift)]**

215. Mass production of a few varieties of products will result in
(a) low cost of unit
(b) advantage to industrial economies of scale
(c) benefits to the customers of important economies
(d) increased cost of production

216. Development and use of specialized machinery will lead to
(a) more varieties of products
(b) decreased consumer welfare
(c) import of varieties of product
(d) hindred intra - industry trade

217. What was the result of removing obstructions to flow of trade in European Union?
(a) Slowdown in inter industry trade
(b) Flow of equal Products
(c) Growth in volume of trade among state members
(d) Emphasis on product variety

218. Low print properly price means: -
(a) continous product operation
(b) Lack of varieties
(c) Growth in trade information exchange
(d) Growth in consumer's purchasing power print properly

219. Which of the following will show the impact of international competition on inter-industry trade?
(a) Availability of varieties of products
(b) Only one typed limited variety
(c) Adverse effect on industrial production
(d) Restrictive profits of productions

PASSAGE - 42

The pre-first world war era is really in a way well suited for an in-depth evaluation of popular movements, as they were spontaneous and no more than, marginally affected intelligentsia ideologies, objectives or techniques. The limitations of such spontaneity are fairly clear. Popular movements were directed usually against the immediate Indian oppressor rather than the distant white superior, and so were often not consciously or subjectively anti-imperialist. They tended to be fairly widely scattered in both space and time, and were extremely volatile with different social forms of articulation interpenetrating and passing over each other with bewildering ease. All this makes it rather difficult to accept without some qualification the concept of 'Peasant nationalism' as a coherent alternative to elite patriotic ideologies and movements. Popular initiative and autonomy were undoubted, even remarkable at times, but, unlike middle class nationalism which does have certain continuity, at the level of ideology at least, from the formulation of the drain of wealth theory in the 1870s onwards, the movement that have been considered were clearly fragmented. Yet despite such limitations and crudities, popular unrest did anticipate much of middle class nationalism in terms of issues and forms of struggle, while its specific gains were at times not inconsiderable.

Forest rights, the burdens of rent, usury and land revenue, planter exploitation and labour grievances were all themes taken over by middle class nationalism later. **[3rd Dec. 2019 (First Shift)]**

220. What is the author's assessment of the popular movements?
(a) Some of the popular issues were taken over by middle class nationalism
(b) It was bewildering and amusing
(c) It was remarkable and time-tested
(d) Pre-war popular unrest was anti-imperialist

221. What does the analysis of pre-first world war popular movements reveal?
(a) Intelligentsia's influence on popular movement was less
(b) The movements were ideological
(c) The movements had clear objectives
(d) Limited spontaneity

222. The pre-war popular movements were of
(a) uniform social form
(b) insignificant value
(c) middle class nationalism
(d) specific gain at times

223. The popular movements were
(a) against imperalists
(b) against their masters
(c) consciously violent
(d) time bound

224. According to the passage, the issue with peasant nationalism was
(a) a viable alternative to elite nationalism
(b) coherence and control
(c) lack of continuity
(d) quite timely

PASSAGE - 43

Under the labour theory of value. the value or price of a commodity depends exclusively on the amount of labour going into the production of the commodity. This implies that either labour is the only factor of production or labour is used in the same fixed proportion in the production of all commodities and that labour is homogeneous, i.e. of only one type. Since neither of these assumptions is true, we cannot base the explanation of comparative advantage on the labour theory of values specifically. Labour is not the only factor of production, nor is it used in the same fixed proportion in the production of all commodities. For example, much more capital equipment per worker is required to produce some products, such as steel, than to produce other products such as textile. In addition. there is usually some possibility of substitution between labour, capital and other factors in the production of most commodities. Further more, labour is obviously homogeneous but varies greatly in training, productivity and wages. At the very least. we should allow for different productivities of labour. Indeed, this is how the Ricardian theory of comparative advantage has been tested empirically. In any event, the theory of comparative advantage need not be based on the labour theory of value but can be explained on the basis of the opportunity cost theory which is acceptable. To be noted is that Ricardo himself did not believe in the labour theory of value and used it only as a simple way to explain the law of comparative advantage. The law of comparative advantage is sometimes referred to as the law of comparative cost.

[3rd **Dec. 2019 (Second Shift)]**

225. In the Labour Theory of Value, when it comes to production of commodities, engagement of labour is
(a) heterogeneous (b) in-fixed proportion
(c) in-varied proportion (d) capital intensive

226. According to the author of the passage
(A) labour is the basis of commodity pricing
(B) labour can be substituted with capital
(C) less capital equipment per worker is required for products like textile
(D) opportunity cost can help explain comparative advantage
(E) Ricardo used the labour theory of value only to explain comparative cost
(F) Ricardo was not sure of his own theory
Choose the correct option :
(a) (A), (B) and (C) (b) (B), (C) and (D)
(c) (D), (E) and (F) (d) (C), (D) and (E)

227. The Ricardian Theory is examined on the basis of
(a) labour value
(b) homogeneity of labour
(c) different levels of labour productivity
(d) law of possibility

228. What does the Labour Theory of Value imply?
(a) Labour is an extra factor in production
(b) Labour has a limited role in production
(c) Labour has the highest value in production
(d) Commodity price and labour value are directly related

229. Products like steel need
(a) less workers (b) more workers
(c) more machines (d) less machines

PASSAGE - 44

There is no doubt that the market as a reality and political economy as a theory played an important role in the liberal critique. But liberalism is neither the consequence nor the development of these: rather, the market played, in the liberal critique, the role of a "test". A locus of privileged experience where one can identify the effects of excessive governmentality and even weigh their significance: the analysis of the mechanisms of "dearth" or more generally, of the grain trade in the middle of the eighteenth century, was meant to show the point at which governing was always governing too much. Therefore, an analysis to make visible, in the form of evidence, the formation of the value and circulation of wealth—or, on the contrary, an analysis presupposing the intrinsic invisibility of the connection between individual profit-seeking and the growth of collective wealth economics, in any case, shows a basic incompatibility between the optimal development of the economic process and maximisation of government procedures. It is by this, more than the play of ideas. The French or English economists broke away from mercantilism and commercialism: they freed reflection on economic practice from the hegemony of the "reason of state" and from the saturation of governmental intervention. By using it as a measure of "governing too much", they placed it at the limit of governmental action. Liberalism does not derive from juridical thought any more than it does from an

economic analysis. It is not the idea of a political society, but the result of search for a liberal technology of government.

[4th **Dec. 2019 (First Shift)]**

230. What is incompatible with optimal economic development?
(a) Play of ideas
(b) Absence of commercialism
(c) Political society
(d) Excessive government procedures

231. The liberal critique examined the implications of
(a) Market expansion
(b) Too much governance
(c) Growth of political economy
(d) Politics of marketisation

232. Which of the following played a role in the liberal critique?
(a) Liberalism as a consequence of market forces
(b) Liberalism as an offshoot of political economy
(c) Reality of market
(d) Political economy as a practice

233. What kind of evidence was needed to make the liberal critique visible?
(a) Circulation of wealth
(b) Pre-supposing individual profit
(c) Dearth in supply of grain
(d) Incompatibility of growth

234. The passage is indicative of the author's preference to
(a) Economic hegemony of individuals
(b) Limit government control of economics
(c) Seek liberalism from juridical thought
(d) Promote individual profits

PASSAGE - 45

Eventhough globalisation is one of the most discussed topics in the contemporary world, it is not altogether a well defined concept. A multitude of global interactions are put under the broad heading of globalisation, varying from the expansion of cultural and scientific influences across borders to the enlargement of economic and business relations throughout the world. A wholesale rejection of globalisation would not only go against global business, it would also cut out movements of ideas, understanding, and knowledge that can help all the people of the world. including the most disadvantaged members of the world population. A comprehensive rejection of globalisation can thus be powerfully counterproductive. There is a strong need to separate out the different questions that appear merged together in the rhetoric of the antiglobalisation protests. The globalisation of knowledge deserves a particularly high profile recognition, despite all the good things that can be rightly said about the importance of "Local knowledge".

Globalisation is often seen, both in journalistic discussions and in remarkably many academic writings, as a process of westernization. Indeed, some who take an upbeat view of the phenomenon even sees it as a contribution of Western civilization to the world. **[4th Dec. 2019 (Second Shift)**

235. (a) Unconditioned advocacy of globalisation
(b) Unconditioned rejection of globalisation
(c) Unconditioned rejection of local knowledge systems
(d) Unbiased evaluation of globalisation

236. According to the passage, which one of the following is counter productive?
(a) Comprehensive support to globalisation
(b) Wholesale rejection of globalisation
(c) Comprehensive rejection of anti ~ globalisation protests
(d) Recognition of local knowledge systems

237. According to the passage, globalisation is perceived often by media and academia as :
(a) Supporting local knowledge systems
(b) Detrimental to local knowledge systems
(c) A process of Westernisation
(d) A process of facilitating global bussiness

238. According to the passage, which one of the following is not a well defined concept?
(a) Multiculturalism
(b) Identity
(c) Globalisation
(d) Local Knowledge

239. As per the passage, a wholesale rejection of globalisation would result in affecting.
(a) Global businesses
(b) Movement of Ideas
(c) Local knowledge systems

Choose the correct answer from the options given below :
(a) (A) and (B) only (b) (A) and (C) only
(c) (C) and (B) only (d) (A), (B) and (C)

PASSAGE - 46

I do not wish to suggest that the humanistic elements in education are less important than the utilitarian elements.To know something of great literature, something of world history something of music and painting and architecture, is essential if the life of imagination is to be fully developed. And it is only through imagination that men become aware of what the world might be without it: 'progress would become mechanical and trivial. But science, also can stimulate the imagination.

Psychology was until fairly lately. a merely academic study, with very little application to practical affairs. This is all changed now. We have, for instance, industrial psychology, clinical psychology, educational psychology: all of which are of the great practical importance. We may hope and expect that the influence of psychology upon our institutions will rapidly increase in the near future. In education, at any rate, its effect has already been beneficent. [5th **Dec. 2019 (First Shift)]**

240. As per the passage, if the life of imagination is to be fully developed, some exposure to the following is required:
(A) Literature (B) World history
(C) Music (D) Politics.

Choose the correct options from these given below:
(a) Only (A) and (B)
(b) Only (A) and (C)
(c) Only (A), (B) and (D)
(d) Only (A), (B) and (C)

241. As per the passage, without imagination the 'progress' would become
(a) Humanistic (b) Mechanical
(c) Creative (d) Realistic

242. In the passage, the author is optimistic about
(a) The utilitarian elements in education
(b) Decrease in the role of imagination in education
(c) The role of psychology in laboratories
(d) Increase in the influence of psychology upon institutions.

243. According to the passage, psychology until recently was of very little
(a) Academic orientation
(b) Application in academics
(c) Application to practical affairs
(d) Application to imagination

244. As per the passage, people become aware of "What the world might be?" only through
(a) Literatue (b) History
(c) Imagination (d) Music

PASSAGEV - 47

All art is a blend of form and content: and it is through certain excellence characterizing either, that the artist succeeds in inducing in us the artistic attitude. In the case of poetry, for example, the content is constituted by the figurative ideas, and sentiments it expresses: and the form, by the musical language through which they find expression. Of these, the form varies much from one art to another; and it is also technical. We shall not refer to it here at any length, and shall confine our attention mainly to the content. We shall only observe, in passing, that the legitimate function of form is to subserve the content: and if it assumes greater importance, the work in which it does so marks a lapse from the best type of art. The content of art may be defined generally as the meaning which it expresses. The excellence that may characterize it are many, and they have been classified in various ways. **[5th Dec. 2019 (Second Shift)]**

245. What constitutes the content of poetry according to the passage?
(a) Figurative ideas
(b) Musical language
(c) Sentiments it expresses
Choose the correct code from below:
(a) Only (A) and (B) (b) Only (A) and (C)
(c) Only (B) and (C) (d) Only (B)

246. Content of the art is defined in the passage as
(a) The form it exhibits
(b) The language it uses
(c) The meaning it subsumes
(d) The meaning it expresses

247. What kind of art is the best type as per the passage?
(a) The one which lends greater importance to content
(b) The one which lends greater importance to form
(c) The one in which form subserves the content
(d) The one in which content subserves the form

248. What is legitimate function of form?
(a) To obverse the content
(b) To reject the content
(c) To subserve the content
(d) To subsume the content

249. Which of the following is correct with respect to the form of poetry as per the passage?
(A) Form doesn't vary from one art to another
(B) Form is technical
(C) Form is figurative
(D) Form constitutes musical language Choose the correct option from below:
(a) Only (A) and (B)
(b) Only (B) and (D)
(c) Only (B), (C) and (D)
(d) Only (A), (C) and (D)

PASSAGE - 48

Anyone who has ever been in a classroom where the teacher's presentation was lifeless, static and without vocal variety ran appreciate the commonsense value of the affective side of teaching. However, unlike the other behaviours, affect cannot be captured in transcripts of teaching or by classroom interaction instruments.

Narrowly focused research instruments often miss a teacher's aective nature, which emerges from a more holistic view of the classroom. This aective nature is the foundation on which one can build a warm and nurturing relationship with his or

her learness. What the instruments miss, the students see clearly. Students are good perceivers of the emotions and intentions underlying a teacher's actions and they often respond accordingly. A teacher who is excited about the subject being taught and shows it by facial expressions, voice inection, gesture and movement thus communicating respect and caring for the learner- is more likely to hold the attention of students and motivate them to higher levels of achievement than one who does not exhibit these behaviours. Students take their cues from these aective signs and lower or heighten their engagement with the lesson accordingly.

Enthusiasm is an important aspect of a teacher's aect. Enthusiasm is the teacher's vigour, power, involvement excitement, and interest during a classroom presentation and willingness to share this emotion with learners, who will want to respond in kind.

[6th Dec. 2019 (First Shift)]

250. The aective nature of teaching is reected in
(a) Deeper understanding of the classroom environment
(b) Other behaviours of the teacher
(c) The recording of classroom interaction
(d) The limited reliance on research instruments

251. The affective signs will provide students
(a) The basis for understanding contents
(b) Exhibitional behaviours
(c) Cues to hold attention
(d) A basis which triggers further enthusiasm

252. The passage focuses attention on
(a) Lifeless classroom presentation
(b) Affective factors of teaching
(c) Students as emotional learners
(d) Measuring teacher's affective nature

253. When does one feel the need for the value of affective aspects of teaching?
(a) When a teacher has a vocal variety
(b) When a teacher makes a dynamic presentation
(c) When a teacher's presentation is monotonous
(d) When a teacher's lecture is beyond expectation

254. Students respect a teacher who
(a) Is emotional
(b) Displays concern for students
(c) Has a powerful voice
(d) Has narcissitic attitude

PASSAGE - 49

The motives for direct investments abroad are generally the same as earning higher returns, possibly resulting from higher growth rates abroad, more favourable tax treatment or greater availability of infrastructure and diversifying risks. Indeed, it has been found that firms with a strong international orientation, either through exports or through foreign production and/or sales facilities, are more profitable, and have a much smaller variability in profits than purely domestic firms. Although these reasons are sufficient to explain international investments they leave one basic question unanswered with regard to direct foreign investments. That is, they cannot explain why the residents of a nation do not borrow from other nations and themselves make real investments in their own nation rather than accept direct investments from abroad. After all, the residents of a nation can be expected to be more familiar with local conditions and thus to be at a competitive advantage with respect to foreign investors. There are several explanations for this. The most important is that many large corporations, usually in monopolistic and oligopolistic markets, often have some unique production knowledge or managerial skill that could easily and profitably be utilized abroad and over which the corporation wants to retain direct control. In such a situation, the firm will make direct investments abroad. This involves horizontal integration or the production abroad of a differentiated product that is also produced at home. This helps serve the foreign market better by adapting to local conditions than through exports.

[6th Dec. 2019 (Second Shift)]

255. In the case of direct foreign investments, what factor remains unaddressed?
(a) Acceptance of foreign investment
(b) Non-acceptance of foreign investment
(c) Absence of competitive edge
(d) Role of monopolistic corporations

256. Purely domestic firms are affected by
(a) Low interest rates
(b) Small variability of profits
(c) Larger variability of profits
(d) Export controls

257. What advantage do large corporations have in oligopolistic markets?
(a) Direct control over profitability
(b) Large production of undifferentiated products
(c) Localization of managerial skills
(d) Eliminating barriers to higher profits

258. The passage focuses on the aspects mainly related to
(a) Indirect control over investments
(b) International orientation of investment
(c) Sales facilities
(d) Risks involved in integration of production

259. The possible reasons of direct foreign investment can be
A. Higher returns
B. Better tax regimes
C. Availability of infrastructure
D. Risk mitigation
E. Financial support from local investors
Choose the correct answer from the options given below:
(a) A, D and E only (b) B, C and D only
(c) A, B and C only (d) D, E and B only

HINTS & EXPLANATION

1. (c) Refer to the opening sentence of the passage.

2. (c) Refer to the 3rd sentence of Para 1: 'Sanskrit is a favourite...'

3. (a) Refer to the 3rd sentence of para 3: Such is the reputation... local Muslim strongmen... protect the school during the riots.'

4. (c) Refer to the 3rd sentence of para 4: 'Significantly, the only Muslim teacher in the 40 - member teaching staff, Husena Mansuri, teaches Sanskrit.'

5. (b) Refer to the last sentence of the passage: 'Truly, Shantiniketan is a beacon of hope... Hindus and Muslims can live side-by-side with mutual respect.'

6. (b) The author opens the discussion saying knowledge creation requires creativity and idea generation and goes on to focus on idea generation methods and techniques.

7. (b) Refer to the sentence, 'This understanding has ... in para 1.

8. (a) Refer to the sentences, 'Manual methods... However, in other situations... not possible' in para 1.

9. (a) Refer to the 1st sentence of para 1:, 'Idea-generation software is designed to help stimulate...'

10. (b) Refer to the last two sentences of para2: 'Some software packages use questions... This helps users to break out of...'

11. (d) This would ensure fair and free elections
Refer to the expressions, such as 'independent constitutional authority', 'insulation from executive

interference' and 'information relating to Government dues owed by the candidates should be published by the commission', etc.

12. (a) 324

Refer to sentence 1, Para 2.

13. (a) have a constitutional status.

Constitutional status means the status/power enjoyed by virtue of being allowed by or contained in a constitution. Legislative power means power to make laws, judicial power is power to pronounce judgements, and political power means authority enjoyed by virtue of being related to the government or public affairs of a nation.

14. (b) Fair and free election means to maintain law and order.

Fair' means equal right to all registered political parties to contest elections, campaign for voter support and hold meetings/ rallies; equal right to vote for every voter enumerated in the electoral roll; and honest conduct of the process of polling. 'Free' means freedom granted to every voter to vote for a candidate of one's choice in a secret ballot. This can be possible only with the maintenance of law and order to ensure smooth conduct of the process and no discrimination of any kind.

15. (d) 324

Refer to sentence 1, para2 : '... under Article 324 (5) of the constitution that the chief Election Commissioner shall not be removed...'

16. (b) Zeitgeist

Refer to sentence 1, para 2: 'The Germans coined...'

17. (b) Yash Chopra

Refer to sentence 3, para 2: 'After being the...'

18. (d) Desh Ki Dharti

Refer to para 3.

19. (d) Veer Zaara

Refer to sentence 3, para 2: 'After being the... in a new movie, Veer Zaara, set in 1986...'

20. (c) Traditional Punjabi Clothes

Refer to the last sentence of the passage, 'The new heroine... dressed in traditional Punjabi clothes...'

21. (b) Refer to sentence 2, 'Those that fail risk a dysfunctional government...'

22. (a) Refer to sentence 3, 'Corruption is one symptom of such failure...'

23. (c) Refer to the sentence, 'If corruption is endemic, public officials...many opportunities for private profit...'

24. (a) Refer to the sentence, 'Governments may be honest but inefficient because no one has an incentive to work productively...'

25. (c) The passage says that if corruption is endemic, public officials may propose public projects with few public benefits and many opportunities for private profit; therefore, efforts to promote 'good governance' must be broader than anti-corruption campaigns.

26. (c) Refer to sentence 2, para 1: 'His early introduction...'

27. (a) Refer to the opening sentence of the passage.

28. (b) Refer to the third sentence of the passage, 'His deep concern...'

29. (d) The passage states, 'Gandhi was also concerned about the destruction, under colonial and modernist designs, of the existing infrastructures... especially in the rural areas...'

30. (a) Refer to the sentence, 'Perhaps the moral principle... not injuring another being.'

31. (c) 14

Refer to sentence 2, para 1.

32. (b) Refer to sentence 2, para 1: 'The thrust…'

33. (a) Refer to sentence 3, para 1: 'In the very nature… will have to strive by both legislative and executive action…'

34. (a) Refer to sentence, 'The doctrine was evolved… help weaker sections of the society…'

35. (a) Refer to this sentence in the last para: '…the executive government, while dealing with diverse problems arising out of an infinite variety of human relations must of necessity have the power of making special laws…'

36. (d) Refer to the sentence, 'Both official and corporate India...'(para 1)

37. (b) Refer to the sentence, 'The increase in premature deaths...' The passage neither hints that our economy is crumbling (option A); nor does it associate these deaths with population control (option C) or less job seekers (option D).

38. (c) Refer to the sentence, 'Most mechanical two wheelers ... without proper pollution control system.'

39. (d) Refer to para 2: expressions such as 'the stage is set for the usual battle between the developing world and the West', and 'U.N. environment report will likely find a place in the U.S. arsenal as it plants an accusing finger towards countries like India and China.'

40. (d) Refer to the opening sentence of the passage.

41. (b) The sentence, 'One of the most beneficial institutions, which were initiated by the British, was democracy' suggests that before democracy which involves people in the election process, people were isolated from political affairs as they were ruled by hereditary kings.

42. (b) Rule of the people, by the people and for the people

Refer to para 3.

43. (a) Elected members form a uniform opinion regarding policy matter.

Refer to the sentence, 'Normally, members ...but they manage to work on the basis of a consensus...'(para 4)

44. (a) It was behind the modernization of the Indian society.

Refer to the first sentence of the passage, '... detrimental to the economic development... modernizing Indian society... formed several progressive institutions...'

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Although, progressive (developing / reforming in stages) institutions were established, progress was not the motive.

45. (d) Merchants and artisans

Refer to the first sentence of the last paragraph.

46. (c) The trials of INA functionaries by the British government is the dominant theme of the passage.

47. (a) Refer to the sentence, ' ... an Intelligence Bureau note admitted ...this particular brand of sympathy cuts across communal barriers.'

48. (d) The Indian National Army (Azad Hind Fauj) was an armed force formed by Indian nationalist Rash Behari Bose in 1942 in Southeast Asia during World War II with the aim of fighting for Indian independence from British rule. It was revived under the leadership of Subhash Chandra Bose after his arrival in Southeast Asia in 1943.

49. (d) Indians sympathised with the persons who were to be trialled.

Since, representatives of different religions were to be tried, it evoked a general sympathy of all Indians rising above religious differences.

50. (b) Refer to the sentence, 'A majority of the men now awaiting trial in the Red Fort is Muslim. Some of these men are bitter that Mr. Jinnah is keeping alive a controversy about Pakistan.'

51. (a) Feeling of nationalism and fraternity

52. (a) Refer to sentence 1, '.....thought process.'

53. (c) Refer to para 2.

54. (a) Refer to sentence 2, para 3: '...the mental image is described as a concept.'

55. (c) Refer to para 4: 'The relation of Percept to Concept... what they perceive is a reflection of these preconceptions.'

56. (b) The theme of the passage is contained in the sentences 'How does one go about observing and reporting on things and events that occupy segments of earth space?' (para 1) and 'During the long record of our efforts to gain more and more knowledge about the face of the earth as the human habitat...' (para 3)

57. (a) Refer to sentence 2, para 3.

58. (b) The passage hails the role of Gandhi in India's freedom movement.

The passage discusses mainly the positive effects of Gandhi's personality as well as his movements. So, it is not a critique.

59. (d) Refer to Para 2: Gandhi made people think...That was an amazing psychological change.

60. (a) To consider the nationalist movement or to criticise it as a working-class movement was wrong because it was a historical movement.

Refer to the opening lines: '...the nationalist movement in India...was essentially a bourgeois (middle class/ masses) movement... Gandhi represented that movement and the Indian masses ...' Working class movements pertain to industrial revolutions.

61. (b) reach the heart of Indians

Refer to para 3.

62. (a) objective conditions of masses

Refer to para 3.

63. (c) Pointing out the importance of the personality of Gandhi

Refer to the concluding sentence, '...he has represented the spirit and honour of India...an insult to him ... has been an insult to India and her people'.

64. (a) Refer to the words, '...for the intellectual historian, a full understanding of his chosen texts is itself the aim of his enquiries.' (Para 1)

65. (b) Refer to the sentence, 'His distinctiveness lies...not in having exclusive possession of either a corpus of evidence or a body of techniques.'(Para2)

66. (c) Refer to these sentences in Para 3: It is alleged that intellectual history is the history of something that never really mattered. The long dominance of the historical profession by political historians bred a kind of philistinism, an unspoken belief that power and its exercise was 'what mattered'.

67. (d) Refer to the lines, '... philistinism, an unspoken belief that power and its exercise was 'what mattered' (Para 3). 'Phlistinism' is the attitude of disdain for intellectual or artistic values driven by materialism.

68. (d) Refer to the lines, '... a wider intellectual history... for example, the common stock of knowledge about cosmological beliefs or moral ideals of a period.'

69. (d) Refer to the last line of the passage, '...the mirror-image of this philistinism...

70. (d) Inordinate development.

Refer to the opening sentence of the passage, 'The catalytic fact of the twentieth century is uncontrollable development...' and the subsequent discussion initiated by, 'This inordinate development...'

71. (a) What is Refer to the lines, 'The de facto values describe what we are, they portray the 'is' of our ethic..'(Para 1)

72. (d) enlightened rationalism

Refer to the sentence, 'As the century closes ... the 'first reality' of enlightened rationalism and...'(Para 1)

73. (b) Universe is both material and non-material Refer to the sentences, 'The materialistic foundations of science have crumbled down. Science itself has proved that matter is energy, processes are as valid as facts, and affirmed the non-materiality of the universe. This encounter...' (Para 2)

74. (a) Descriptive

Optional: available to be chosen but not obligatory.

Axiomatic: self-evident or unquestionable.

Prescriptive: established or accepted by long usage or the passage of time.

Descriptive: that explains things as they actually are, not as wished

The passage describes things as they stand or the reality as it is. It neither suggests options, nor prescribes the way to be; nor does it state unquestionable ideas.

75. (b) Matter is energy

Refer to the sentence, 'Science itself has proved that matter is energy...' (Para 2)

76. (a) by acquiring knowledge.

Refer to sentence 1, '....power that knowledge gives....'

77. (a) enable citizens to participate fully in the decision making process

Refer to the sentence, 'In the maturing of our democracy ... in the decision making process.'(Para 1)

78. (b) as an instrument for improving Government- citizen interface resulting in a friendly, caring and effective Government.

Refer to this sentence in para 1: He said, "I would only like to see... in a friendly, caring and effective Government..."

79. (c) recognizing Judiciary a pioneer in implementing the act in letter and spirit.

Refer to sentences 1 and 2, para 1: The Commission... The Judiciary could be a pioneer....

80. (d) All the above

Refer to this sentence in para 1: He said, "I would..... our civil servants, should see the Bill in a positive spirit; not as a draconian law for paralyzing Government... working will be kept under constant reviews."

81. (d) Legislature, Executive and Judiciary

The sentence, 'The Commission, in its Report, has dealt with the application of the Right to Information in Executive, Legislature and Judiciary' in para 2 reflects the fact.

82. (b) The first sentence of the passage mentions that despite its benefits and comforts, urbanisation has caused degradation of environment and chaos in human life.

83. (a) The total increase in the number of urbanites in developing countries was 1700 million (2 billion minus 1700 million) in 50 years (from 1950 to 2000 A.D.). So, the average annual increase is was close to 30 million (1700/50 =34 m)

84. (a) Refer to sentence 2, para 1: Given the unprecedented.... the wonder really is how well the world has coped, and not how badly.

85. (a) Para 2 mentions the availability of various social amenities and basic services as it discusses the urban quality of life in developing countries. How fast or slow the process of urbanisation is, doesn't find any mention in this discussion.

86. (c) The author has provided facts and figures and analysed the situation to justify his claims and conclusions. The passage is neither mere description nor an extension of human knowledge; and, though it mentions environmental degradation as a fallout of urbanisation, there is no attempt to generate environmental consciousness.

87. (d) The author mentions that developing countries have succeeded in providing efficient and quality-oriented public management 'for an additional population of more than 293 million citizens within a decade' facing fiscal crunch and strained human resources. The words 'crunch' and 'strained' convey that there are limits to growth.

88. (b) Makrana.

89. (d) European travellers.

90. (c) The Taj Mahal is surrounded by a four-quartered garden known as Chahr Bagh.

91. (d) Rauza-i-Munavvara.

92. (c) 1632 - 1643 A.D.

The passage mentions that, 'imperial orders issued between 1632 and 1637'got logistic support from Jai Singh and also, that 'By 1643, when Shah Jahan most lavishly celebrated the Urs ceremony for Mumtaz Mahal, the entire complex was virtually complete'. So, the construction of the Taj Mahal was completed between the period 1632 - 1643 A.D.

93. (a) The documents indicating the ownership of land, where the Taj Mahal was built, known as Farman.

94. (b) Refer to sentence 1, para 1.

95. (a) Representatives from different political parties and women's organizations were made the members of the Committee of Publicity. The words, 'though the leftists claimed a sort of proprietary right over her, Aruna encouraged and treated all members alike' hint that leftists were also among the member parties. But in that case, (i) already includes them; so, the correct code will be (a) (i), (iii).

96. (b) Refer to the sentence, 'It was not her political affiliations....'

97. (b) Refer to the sentence, 'Representatives from..... though the leftists claimed a sort of proprietary right over her....'

98. (c) As per the passage, Aruna Asaf Ali's health began to deteriorate around late eighties and early nineties which is best covered in the period 1981-2000.

99. (d) All the above

Refer to the 2nd sentence of para 2: Though her mind remained alert....pet causes— .....'

100. (a) after the establishment of the International Centre for the Study of the Preservation and Restoration of Cultural Property. Refer to the first sentence of para 1.

101. (b) Imparting training to professionals and sharing technical expertise.

Refer to the second sentence of the para 1.

102. (c) Consistent investment, rigorous attention, and dedicated research and dissemination of awareness for conservation.

Sentence 4 of para 1 mentions that 'Consistent investment, rigorous attention, and dedicated research and dissemination are some of the positive lessons to imbibe', which conveys that these factors spell success.

103. (a) 10 percent The total number of monuments in India includes 6600 protected and more than 60000 unprotected ones. So, the percentage of protected monuments can be calculated as 6600x100/(6600+60000)=6600x100/66600=6600/666=approx. 10 per cent.

104. (b) (i), (ii), (iv) Statement (i) is derived from the sentence,' Countries such as Italy...'; (ii) from 'in order to overcome this shortage...'; and (iv)from 'It would make...as has been done in Europe.'

Sentence (iii) is not mentioned.

105. (d) Indian National Trust for Art and Cultural Heritage.

106. (b) Peaceful co-existence of social groups of different historical provenances attached to each other in a geographical, economic and political sense, is a special feature of the Indian State.

107. (b) The author uses the word 'State' to highlight Absence of conflict between the state and the individuals up to a point in time.

108. (a) No discrimination on religious considerations is the peculiar feature of modern Indian 'Secularism'.

109. (a) The basic construction of Thomas More's Utopia was inspired by Indian tradition of religious tolerance.

110. (d) The striking feature of modern India is Absence of Bigotry.

111. (c) Refer to sentence 2, para 1: ' A political novel.....'

112. (b) Refer to these words in para 1, '....for it seeks not merely to show us how things are...that desired direction.' It clearly shows that a political novel reveals the writer's perception, i.e., their way of seeing things.

113. (b) Refer to sentence 1, para 2: Another reason.... ideas and ideologies.'

114. (d) Refer to sentence 3, para 2: Literature, it is argued,.... lifeless ideas.'

115. (b) Refer to the sentence, 'Her formulation of the precise nature of the incompatibility ... betrays perhaps a divided conscience ... writers and readers'.

Thus, the observation of the novelist, Mary McCarthy reveals dichotomy of conscience on political ideas and novels.

116. (c) Refer to the sentence, 'Our history, knowledge and understanding are all the collections of the few stories that survive 14. (d) Story telling is the essence of what makes us human.'

117. (d) The first paragraph mentions that storytelling is not in our genes. It does not mention whether it is an art or a science. It says, 'It is the essence of what makes us human.'

118. (a) Refer to the last sentence of Para 2.

119. (a) (A), (B) and (C)

As per the passage, 'rational optimists' believe that all will be fine so long as we leave everything up to a few especially able adults and they tend to claim that it is human nature to compete and to succeed and also to profit at the expense of others.

This conveys that they look for opportunities, are sensible and cheerful, and are selfishly driven.

120. (a) Refer to the words, 'large groups work in less selfishness'.

121. (a) Refer to the last sentence of the paragraph, 'this aspect in storytelling.....are doomed.'

122. (a) A rabbit is stupefied by the suddenly appearing headlights of a vehicle that bathe it and dazzle its vision and mind. In a similar way, the author was befuddled when he needed to sign a big card because he was overwhelmed by the myriad options available.

123. (d) In the last sentence of the extract, the author mentions handwriting, sketching, painting and photography as the most creative outlets of pursuit.

124. (b) (a) and (b) only

The entire existence of the author revolves round mobile phone and computer, as mentioned in the second paragraph of the extract.

125. (d) 1 in 10 is equivalent to 100 in 1000 teens not owning a pen.

126. (d) This is the main concern of the author as he calls it a 'horror' that he had forgotten to write; and concludes the piece by comparing handwriting to art pursuits such as, painting, sketching and photography.

127. (c) Refer to the 2nd sentence of para 3: An organization with superior knowledge can achieve competitive advantage in markets that appreciate the application of such knowledge.

128. (a) Refer to these sentences in para 2, 'But today capital flows internationally at rapid speed. Global commerce no longer requires regional interactions among business players.'

129. (d) Knowledge-driven competitive advantage.

Refer to the sentence, 'Only if an organization.... sustainable over time.'

130. (b) Refer to the first sentence of the passage.

131. (c) Because of new competitors.

Refer to the last sentence of para 1.

132. (d) Refer to the last sentence of para 2.

133. (d) Company longevity

Refer to sentence 2, para 1.

134. (b) Financial returns from each new film

Refer to sentence 2, para 2: '...each new film... is sufficient for the company to be successful.'

135. (a) Benefit for the next project

Refer to sentence 2, para 3: '...this same company intends...benefit from their increased experience on the next project.'

136. (b) Retention for the next project
Refer to sentence 3, para 3: '...this same company has little or no expectation of retaining such participants.'

137. (c) Because of short time horizons
Refer to sentences 2 and 3 of para 4: '...budgets are very tight, and schedules are very demanding. People... perform well immediately when called to do so.'

138. (c) Exploitation
Refer to the second last sentence of the passage: 'True... focuses heavily on exploitation...'

139. (b) It aggravated popular revulsion against violence.
Refer to the first sentence of the passage.

140. (b) Exposed the humane pretensions of the Western World.
Refer to the first two sentences of the passage.

141. (d) They expressed sympathy for England's dogged courage.
Refer to the sentence, 'On the one hand, ...

142. (c) The passage mentions that Independence in 1947 released an upsurge of creative energy which was submerged in the great agony of Partition.

143. (d) Refer to the sentences 'These tragedies.....' and 'What reserves of enthusiasm....development.'

144. (b) Great literature emerges out of chains of convulsions.
The passage discusses how the events in the history of India was reflected in its poignant or passionate writing which, however, does not constitute great literature by itself; and concludes in the last two lines that the creative energies have to undergo chains of convulsions to emerge as great literature.

145. (a) Refer to sentence 4, 'Vulnerability...' which informs that poor people are vulnerable to climate change because of their dependence on natural resources, geographical attributes, and lack of financial resource. The last sentence of the passage says that traditional knowledge can help in adaptation, hence there is no lack of it among the poor.

146. (a) The passage mentions that adaptation as a process enables societies to cope with uncertain future, adjustments and changes, negative as well as positive impact of climate change.

147. (b) Implementation of national adaptation policy at their level
The passage mentions that to address the challenge of climate change, developing countries urgently require implementation of national adaptation policy at their level.

148. (c) Synergy between government and local interventions
Refer to the sentence, 'Local coping strategies....'

149. (c) Adaptation to climate change
The passage discusses how societies have been coping with climate change and what is required to adapt to climate change.

150. (c) (a), (c) and (d) only
Refer to the sentence, 'We believe that ....the strategic interests', which mentions all of these three.

151. (a) Pervasive use of technology
Refer to the sentences, 'Technological strengths are the key....Without a pervasive use of technology....years to come.'

152. (b) (b), (c) and (d) only
Refer to the sentences, 'The absence of greater technological impetus...Activities with low productivity...the poorest most.'

153. (d) Lifting our people to a life of dignity
Refer to the sentence, 'the technological imperatives to lift.....is important.'

154. (d) Development of core technological strengths
Refer to the last sentence, '.....development of core technological strengths....for envisioning a developed India.'

155. (c) (A), (B), (C), (E)
Refer to the sentence, 'Here the need to improve...'
Refer to the sentence, 'The link between education and work formed another theme...
Refer to the sentence, ' This calls for a critical appraisal of the highly debatable tendency to give priority to allegedly "practical" knowledge as opposed to mind-broadening subjects...'
Refer to the last sentence, 'It has been shown that greater flexibility...'

156. (d) Refer to the sentence, 'A good quality education should meet...'

157. (b) Refer to the sentence, 'UNESCO...studying the interactions between education, work and unemployment...'

158. (b) Refer to the sentence 4: 'Clearly any assessment of quality...'

159. (d) Refer to sentence 1: 'We live in a world...full participation in the life of societies.'

160. (b) Refer to sentence 2 of passage 1: A modern economy...

161. (a) Refer to the sentence. 'Here comes the role of... establish standards.'

162. (c) Refer to the last sentence, 'An indicator...'

163. (c) The passage states that institutions like National Statistical Commission must be allowed to function autonomously so that they may disseminate economic data on which national policies and investment decisions would be based.

164. (d) Refer to the explanation above.

165. (c) Refer to the sentence, 'For centuries....freedom from external restraints.'

166. (d) Refer to the second last sentence of the passage, 'Even well-intentioned .....seeking media improvement are self serving...'

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167. (c) The passage discusses that the social responsibility theory of the media shifted from negative freedom to positive and the media philosopher John Merrill advocates media autonomy in news and editorial choices to fulfil their social responsibility.

168. (d) Refer to the sentence, 'This does not mollify observers... of authoritarianism.'

169. (b) Refer to the third sentence of the passage, 'Suddenly, however, ...positive freedom, a freedom from pursuit of some predetermined goals.'

170. (c) Refer to the sentence, ' Young writers are buoyed up... the laurel- crown...' It hints that young writers are in a hurry to reap the rewards just by throwing a new work in literature at the world's feet.

171. (a) Refer to the sentence, ' A time comes.....and goes his way unheeding.'

172. (b) Refer to the opening sentence, 'Unquestionably,... miserable.' It indicates that if a literary genius has 'only talent' and not a comfortable life, there are so many cares and worries associated with their art that their life becomes miserable.

173. (d) The passage states that writers have to 'run the gauntlet of the critics' i.e., face their brutal criticism and many sensitive ones succumb to their silent torture and quit writing.

174. (d) Towards the end, the passage mentions that with experience, writers learn to go their way unheeding, i.e., to ignore the critics and continue with their artistic exercise.

175. (b) Refer to the phrases 'high plane of thought' and 'attain that serenity'.

176. (c) Refer to the lines, '...strongest argument in favour...by contact with life's realities.' Without Bacon's

177. (a) Refer to the sentence, 'It is easy to understand..silent companionship of the immortals...'

178. (d) Refer to the sentence, 'the magnificent ideals...by contact with life's realities.

179. (b) The passage relates what great thinkers think and do. The sentence, 'A habitual meditation...thoughts of immortality...invisible to the ordinary traffickers...' suggests that these great thinkers meditate on big problems of human life, including 'thoughts of immortality'.

180. (d) refer to the sentence, ' in recent times, there have been attempts to diagnose famous artists....'.

181. (c) Refer to the sentence, "Renaissance humanism stressed on a serious rethink...accurate details.'

182. (b) Refer to the sentences, ' It is also inferred from authentic analysis that Michaelangelo persisited... his physical infirmities.'

183. (a) Refer to the sentence, 'It is assumed that the time he lived...'

184. (b) Michaelangelo complained of gout and sore joints; yet, was seen hammering days before his death or 'his artistic subject defied his physical infirmities'. It proves option (b) right.

185. (c) Refer to the third paragraph.

186. (a) Refer to the second paragraph : 'The focus at this stage remains...'

187. (d) 'At this early stage , the founder or founders will be a part of every aspect of the daily process of the business'(paragraph 1). The founder moves to a managerial role in the later stage of growth (paragraph 2).

188. (b) Refer to the last paragraph.

189. (b) refer to the last line of the first paragraph: 'The main goal...make a place in the market.

190. (b) Refer to sentence 1.

191. (c) People with high intelligent quotient have good analytical and reasoning skills. So, they have good decision making ability. And people with high IQ are often dissatisfied.

192. (d) Refer to paragraph 2: 'Many organizations...and competitiveness.'

193. (a) Refer to the last sentence of paragraph 1: Since one property ...than people with a low IQ.

194. (a) 'Weightage' is the worth or importance or credit attributed to a unit/item in comparison with others in the same context/domain.

195. (b) Refer to the last sentence of the first paragraph, 'Increasingly, organizations…'

196. (a) Refer to the very first sentence of the passage, 'Indian organizations have traditionally not…'

197. (d) Refer to the 2nd sentence of the third paragraph, 'But it was only after India…'

198. (c) Refer to last paragraph, ' ….rise of trade unions….. boosted the growth of personnel officers…'

199. (a) Refer to the sentence, 'Ancient India was known for its occupation based hierarchy.'…….

200. (b) Refer to the sentence, 'At the continental scale,...'

201. (c) Refer to the last sentence, 'Physical geography works...'

202. (b) Refer to the 3rd sentence of paragraph 2: 'Most systems in nature...'

203. (a) Refer to the 5th sentence of paragraph 1: Pattern is defined...'

204. (c) Refer to the sentence, 'For instance, when a passenger on an aircraft looks out of the window, the view changes according to the scale.'

205. (b) Refer to the 2nd sentence of paragraph 2: 'The people around us identify us…each language user follows this style by habit.'

206. (c) Refer to the 2nd sentence of paragraph 1: 'Animals have a rudimentary…complexity of language.'

207. (d) Refer to the last sentence of paragraph 2: 'Perhaps,…,

208. (d) Refer to the 2nd sentence of paragraph 2: 'The wonder of this process…'

209. (a) Refer to the last two sentences of paragraph 1.

210. (d) Refer to the opening sentence, 'Population representation...'

211. (b) Refer to the above and the second sentence of the passage, 'The resulting liberal democracy...'

212. (d) Refer to the last sentence of the passage, '...the judgements of millions of citizens into the legally authoritative hands of a small number of public representatives, or even the sentiments of thousands into the leadership of a single person.'

213. (c) Refer to the sentence, 'We rely on the representative process to promote political goodness in democratic society, 'But when one imagines the idea of 'representation' these days, its association with ethics or goodness does not spring to mind.'

214. (c) Refer to the sentence, 'While elections and popular pressure surely have political impact, the actions of representatives are the primary, official mechanism for translating democratic citizenship into political power.'

215. (a) Refer to the 2nd and 3rd sentences of the passage, '...produce only one, or at most a few, varieties and styles...This is crucial in keeping the costs low...'

216. (c) Refer to the sentences, 'With few varieties and styles, more specialised and faster machinery can be developed...The nation then imports other varieties and styles from other nations.'

217. (b) Refer to the sentences, 'The importance of intra-industry trade..... It was found that volume of trade surged...'

218. (c) Refer to the lines, 'Intra-industry trade benefits consumers because of the wider range of choices. ... large welfare gains arise from the ability of consumers to greatly increase the variety of goods that they can purchase through trade.'

219. (b) Refer to the sentence, '..., international competition forces each firm or plant in industrial countries to produce only one, or at most a few, varieties and styles of the same product rather than many different varieties and styles.

220. (a) Refer to the sentence, 'Yet, despite such limitations... popular unrest did anticipate (were followed by) much of middle class nationalism...'

221. (a) Refer to the sentences, '..popular movements... (only) marginally affected intelligentsia ideologies...' and 'Popular movements were directed against the immediate Indian oppressor rather than the distant white superior...'

222. (d) Refer to the sentence, ''...popular unrest did anticipate... while its specific gains were inconsiderable.'

223. (b) Refer to the sentence, 'Popular movements were directed usually...so, were often not consciously or subjectively anti-imperialist.'

224. (c) Refer to the sentence, " All this makes it rather difficult to ...'Peasant nationalism' as a coherent (logical; and thus continual) alternative..." It indicates that it lacked continuity "unlike 'middle class nationalism' which does have continuity"...'

225. (b) Refer to the sentences, 'Under the labour theory of value... This implies that …or labour is used in the same fixed proportion in the production of all commodities …'

226. (d) Option (c) is drawn from the line, 'For example, much more capital equipment per worker is required to produce some products such as steel, than to produce other products such as textile.' Option (d) is drawn on the sentence,' In any event, the theory of comparative advantage need not be based on the labour theory of value but can be explained on the basis of the opportunity cost theory which is acceptable.' Option (e) is drawn upon the sentences, '…Ricardo himself did not believe in the labour theory of value and used it only as a simple way to explain the law of comparative advantage. The law of comparative advantage is sometimes referred to as the law of comparative cost.'

227. (c) Refer to the sentence, '… we should allow for different productivities of labour. Indeed, this is how the Ricardian theory of comparative advantage has been tested empirically.'

228. (d) Refer to the opening sentence of the passage, 'Under the labour theory,…the commodity.'

229. (c) Refer to the sentence, 'For example, much more capital equipment per worker is required to produce some products, such as steel, than to produce other products such as textile.'

230. (d) Refer to the lines, '...an analysis presupposing the intrinsic invisibility of the connection between individual profit-seeking and the growth of collective wealth-economics, in any case, shows a basic incompatibility between the optimal development of the economic process and maximisation of government procedures.'

231. (b) As per the liberal critique, the market played the role of a test and examined the effects of 'excessive governmentality' or 'too much governance.'

232. (c) Refer to the answer above: the market played the role of a 'test'.

233. (a) Refer to the sentence, 'Therefore, an analysis to make visible....the formation of the value and circulation of wealth..'

234. (b) The author uses terms like 'excessive governmentality' and 'governing too much' at the outset and states that ' The French or English economists broke away from mercantilism and commercialism: they freed reflection on economic practice from the hegemony of the "reason of state" and from the saturation of governmental intervention. By using it as a measure

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of "governing too much", they placed it at the limit of governmental action.

235. (d) The author neither advocates (see 'it is not altogether a well-defined concept') nor rejects (see 'a wholesale rejection of globalisation would not only...) globalisation; or local knowledge system (see 'The globalisation of knowledge deserves....despite all the good things....importance of local knowledge).

236. (b) Refer to the sentence, ' A comprehensive rejection of globalisation can thus be powerfully counterproductive.'

237. (c) Refer to the second paragraph, 'Globalisation is often seen...'

238. (c) Refer to the opening sentence of the passage, 'Even though globalisation is...'

239. (a) Refer to the third sentence of the passage, 'A wholesale rejection of...'

240. (d) Refer to the sentence, 'To know something of great literature, something of world history, something of music and painting and architecture, is essential if the life of imagination is to be fully developed.' Politics is not mentioned.

241. (b) Refer to the sentence, 'And it is only through imagination ...without it progress would become mechanical...'

242. (d) Refer to the sentence, 'We may hope and expect that the influence of psychology upon our institutions will rapidly increase in the near future.' The words 'hope and expectation' signify the optimism of the author.

243. (c) Refer to the first sentence of the second paragraph, 'Psychology was until fairly recently,...'

244. (c) Refer to the sentence, 'And it is only through imagination that men become aware of what the world might be:...'

245. (b) Refer to the sentence, '...the content is constituted by the figurative ideas, and sentiments it expresses...'

246. (d) Refer to the sentence, 'The content of art may be defined generally as the meaning which it expresses.'

247. (c) Refer to the sentence, 'We shall only observe, in passing, that the legitimate function of form is to subserve the content: and if it (form) assumes greater importance, the work in which it does so marks a lapse from the best type of art.'

248. (c) Refer to answer 247 above.

249. (b) Form is technical and constitutes musical language. This is evident in the sentences, '...the content is constituted by the figurative ideas, and sentiments it expresses: and the form, by the musical language through which they find expression. Of these, the form varies much from one art to another; and it is also technical

250. (a) The passage mentions that neither research instruments measuring classroom interaction nor transcripts of classroom teaching can capture the affective nature of teaching. It needs a much deeper understanding and holistic view of the classroom environment to perceive how the teacher's enthusiasm, emotions and intentions translated into their non-verbal communication cues induce positive behaviour into the learners and motivate them to higher levels of achievement.

251. (d) The affective signs originating from the teacher will provide students a basis which triggers further enthusiasm in them, thereby improving the learning environment. These affective signs do not provide the basis or cues for understanding contents, exhibitional behaviours, or hold attention.

252. (b) The passage focuses attention on the affective factors of teaching, (which relate to moods, feelings/emotions and attitudes), which play a big role in holding student's attention, enthusing them and creating a lively classroom environment all for enhanced learning.

253. (c) The passage clearly describes that affective aspects of teaching include teacher's vocal variety, positive gestures, dynamism and enthusiasm in presenting the lesson, all of which take the teacher's lecture beyond expectation and motivate students to higher levels of achievement.

Hence, when a teacher's presentation is monotonous one feels the need for and understands the value of affective aspects of teaching.

254. (b) Refer to the sentences, 'Students are good perceivers of the emotions and intentions... thus communicating respect and caring for the learner- is more likely to hold the attention of students..'It implies that respect and concern for the students earns the teacher their respect, too.

255. (b) Refer to the lines, ' ...they leave one basic question unanswered....rather than accept direct investments from abroad.'

256. (c) Refer to the lines, '...firms with a strong international orientation....have a much smaller variability in profits than purely domestic firms.'

257. (a) Refer to the lines, '...many large corporations, usually in monopolistic and oligopolistic markets...wants to retain direct control.'

258. (b) The passage focuses on the aspects mainly related to international orientation of investment. It analyses that international corporations are more profitable than domestic firms and prefer direct investment to exports so as to utilise their unique production knowledge or managerial skills profitably on foreign soil. For this reason,, nations do not have the choice to borrow from other nations and make real investments in their own land.

259. (b) Refer to the opening sentence, 'The motives for direct investment abroad...diversifying risks.' It says the motives are same as higher returns but the reasons behind this are better tax regimes, availability of infrastructure and risk mitigation in foreign countries. International corporations have no dearth of finances; they do not require funding from local investors.

CHAPTER 14

Communication

MEANING OF COMMUNICATION

The word communication is derived from the Latin word 'communis' which means 'to make common'.

Communication is the method of transferring information between people or group for mutual understanding and confidence. It involves the flow of information from the sender to the receiver.

The receiver must understand the meaning and message of information. It can also be taken as the process of sharing ideas, thoughts, opinions and views from one person to another person.

Communication involves the transmission of verbal and non-verbal messages. With the help of a sender, a receiver, and channel of communication, it conveys complex, important information. Communication requires the full understanding of behaviors associated with the sender and receiver. It is the exchange of facts, opinion, idea or emotion between two or more than two persons of common interest.

ELEMENTS INVOLVED IN THE PROCESS OF COMMUNICATION

1. Sender: (Source): It is the Sender who initiates the communication process to share some idea.

The sender may be an individual, group, or organization. The sender's experience knowledge, skill, perceptions, and culture influence the message.

2. Encoding: In order to convey his idea, the sender must begin encoding, which means translating idea or information into a message. The process of encoding may involve use of words and language or gestures.

3. Message: Message can be verbal (written or oral) or non-verbal (body language, silence etc.)

4. Channel (Medium): The channel is the means used to convey the message. When immediate feedback is necessary, oral communication channels are more effective because any uncertainities can be cleared up on the spot. In a situation where the message must be delivered to a large group of people, written channels are often effective.

5. Receiver: All interpretations by a receiver are influenced by his experience, attitude, knowledge, skills, perceptions, and culture.

6. Decoding: This receiver decodes the message, i.e. he interprets the words and symbols sent by the sender by using his knowledge and experience in order to make the words and symbols meaningful.

7. Feedback: Feedback is the final link in the chain of the communication process. After receiving a message, the receiver responds in some way and signals that response to the sender.

CHARACTERISTICS OF COMMUNICATION

- **Context:** Context is known as any given situation at the outset. There should be a situation to communicate an idea or feeling.
- **Accurate Message:** The message of a communication must be clear, concise and accurate.
- **Understanding:** Effective communicators must understand to whom they are talking with. They must understand the style of communication.
- **Empathy:** Empathy means putting yourself in the other person's shoes. Effective communicators always see the situation from the perspective of the other person. It also includes the emotions that might be involved with the message.
- **Effective Listening:** Effective listening is hearing intently what other person is saying.
- **Frequent:** Effective communication occurs frequently to ensure that has been received by all students.
- **Multi-Channel:** Effective business communication needs to be sent through multi-channels to ensure that it is received.
- **Face-to-Face:** Face-to-face communication is still one of the most effective types of communication. It should be used whenever possible and practical.
- **Two-Way:** Effective communication gives the opportunity for two-way communication to benefit students and teachers. The communications should be of two-way as students need the opportunity to share their feedback, opinions and thoughts with teachers and educators.
- **Asking for Clarification, when Necessary:** Effective communicators should not be afraid to ask for clarification if they don't understand the message. If anyone asks for clarification, it shows that he really care about the person who is talking. It also ensures that the conversation has proceeded appropriately.
- **Body language:** The effective communicators should know how to tune into the non-verbal message. Body language makes up a large percentage of our messages. Make eye contact with the person you are talking to as much as possible when you are speaking. The communicators should avoid the offensive body language like touching hair and rolling eyes that might convey the lack of honesty.
- **A Positive Attitude:** The effective communicators must work hard to keep their messages positive as no one likes to listen to a complaint. Everyone should focus on what they can do for others instead of doing the things they feel difficult. The communicators must keep the message positive that may allow the other person to accept your "no" with grace.

The Two-way Communication Process

1. **Developing an idea**
2. **Encoding the message**
3. **Transmitting the message**
4. **Reception of the message**
5. **Decoding the message**
6. **Acceptance or rejection of the message**
7. **Using the information**
8. **Giving feedback**

DIRECT AND INDIRECT COMMUNICATION

Direct or Natural Communication	• Communication is direct or natural if it is achieved without the help of any instrument other than the human faculties. • Language, faculties of speech, body language, symbols using the bodily organs etc. facilitate direct or natural communication. • This kind of communication is limited by time and space. • A voice has to be heard, a sign has to be seen. • These call for certain proximity or nearness between the two participants in the communication process, the sender and the receiver(s).
Indirect or Technological Communication	• Indirect or technological communication, on the other hand, uses technology developed by science. • Indirect communication may be between people who are far away in time and space. • It may be with known persons or with strangers.

TYPES OF COMMUNICATION

(i) Intrapersonal communication	(i) It refers to communication that transpires inside a person; and this happens all the time.
(ii) Interpersonal communication	(i) This is the universal form of communication that takes place between two individuals. (ii) Since it is person-to-person contact, it includes everyday exchanges that may be formal or informal and can take place anywhere by means of words, sounds, facial expression, gestures and postures.
(iii) Group communication	(i) Group communication is an extension of interpersonal communication where more than two individuals are involved in exchange of ideas, skills, and interests. (ii) Groups provide an opportunity for people to come together to discuss and exchange views of common interest.
(iv) Mass communication	(i) It is communication from one person or group of persons through a transmitting device (a medium) to a large audience or market. (ii) The channels through which this kind of communication takes place are referred to as mass media.

FORMS OF COMMUNICATION BASED ON CHANNEL

(i) Verbal	• It requires use of words, vocabulary, numbers and symbols and is organized in sentences using language. • Words spoken, listen or written affect our daily life. They have the power to create emotions and move people to take action. • Accurately and clearly delivered verbal communication activates the mind the encourages creativity.
(ii) Non-verbal	• It is the act of imparting or interchanging thoughts, opinions or information without the use of words (using gestures, sign language, facial expressions and body language). • In non-verbal communication the emotional content or meaning is conveyed more by facial expressions and tone of voice rather than what the person is saying.
(iii) Graphical or symbolic	• It involves the process of creating, producing, and distributing material incorporating words and images to convey data, concepts, and emotions. • For instance, drawings, photographs and sketches.
(iv) Written Communication	• Written communication is the act of writing, typing or printing symbols like letters and numbers to convey information. • Communicating effectively in writing requires attention to all aspects of the class room environment.

EXERCISE

1. While establishing communication one should keep in mind **[June-2005]**
(a) The mental condition of the person who communicates
(b) The economic condition of the person who communicates
(c) Psychophysical condition of the person who communicates
(d) Physical condition of the person who communicates

2. A negative reaction to a mediated communication is described as: **[December-2005]**
(a) flak (b) fragmented feedback
(c) passive response (d) non-conformity

3. A good communicator is the one who offers to his audience: **[December-2005]**
(a) plentiful of information
(b) a good amount of statistics
(c) concise proof
(d) repetition of facts

4. Which of the following statement is correct ? **[December-2005]**
(a) Communicator should have fine senses
(b) Communicator should have tolerance power
(c) Communicator should be soft spoken
(d) Communicator should have good personality

5. Orkut is a part of: **[December-2008]**
(a) Intra personal Communication
(b) Mass Communication
(c) Group Communication
(d) Interpersonal Communication

6. Communication becomes circular when **[December-2009]**
(a) the decoder becomes an encoder
(b) the feedback is absent
(c) the source is credible
(d) the channel is clear

7. Didactic communication is **[June-2010]**
(a) intra-personal (b) inter-personal
(c) organisational (d) relational

8. Identify the correct sequence of the following: **[June-2010]**
(a) Source, channel, message, receiver
(b) Source, receiver, channel, message
(c) Source, message, receiver, channel
(d) Source, message, channel, receiver

9. When communicated, institutionalised stereotypes become **[June-2011]**
(a) myths (b) reasons
(c) experiences (d) convictions

10. Public communication tends to occur within a more **[June-2011]**
(a) complex structure (b) political structure
(c) convenient structure (d) formal structure

11. Communication with oneself is known as **[December-2011]**
(a) Organisational Communication
(b) Grapewine Communication
(c) Interpersonal Communication
(d) Intrapersonal Communication

12. While designing communication strategy feed-forward studies are conducted by **[December-2011]**
(a) Audience (b) Communicator
(c) Satellite (d) Media

13. The type of communication that the teacher has in the classroom, is termed as **[December-2012]**
(a) Interpersonal
(b) Mass communication
(c) Group communication
(d) Face-to-face communication

14. Chinese Cultural Revolution leader Mao Zedong used a type of communication to talk to the masses is known as **[December-2012]**
(a) Mass line communication
(b) Group communication
(c) Participatory communication
(d) Dialogue communication

15. The English word 'Communication' is derived from the words **[December-2012]**
(a) Communis and Communicare
(b) Communist and Commune
(c) Communism and Communalism
(d) Communion and Common sense

16. In the process of communication, which one of the following is in the chronological order? **[June-2013]**
(a) Communicator, Medium, Receiver, Effect, Message
(b) Medium, Communicator, Message, Receiver, Effect
(c) Communicator, Message, Medium, Receiver, Effect
(d) Message, Communicator, Medium, Receiver, Effect

17. Means of grapevine communication are **[September-2013**
(a) formal (b) informal
(c) critical (d) corporate

18. Telephone is an example of **[September-2013]**
(a) linear communication
(b) non-linear communication
(c) circular
(d) mechanised

19. In circular communication, the encoder becomes a decoder when there is **[June-2014]**
(a) noise (b) audience
(c) criticality (d) feedback

20. The mode of communication that involves a single source transmitting information to a large number of receivers simultaneously, is called **[December-2014]**
(a) Group Communication
(b) Mass Communication
(c) Intrapersonal Communication
(d) Interpersonal Communication

21. **Assertion (A) :** Formal communication tends to be fast and flexible. **[June-2015]**
Reason (R) : Formal communication is a systematic and orderly flow of information.
(a) Both (A) and (R) are correct and (R) is correct explanation of (A)
(b) Both (A) and (R) are correct, but (R) is not correct explanation of (A)
(c) (A) is correct but, (R) is false
(d) (A) is false but, (R) is correct

22. Which of the following are the characteristic features of communication? **[June-2015]**
(A) Communication involves exchange of ideas, facts and opinions.
(B) Communication involves both information and understanding.
(C) Communication is a continuous process.
(D) Communication is a circular process.
Select the correct answer from the codes given below :
(a) (A), (B) and (C) (b) (A), (B) and (D)
(c) (B), (C) and (D) (d) (A), (B), (C) and (D)

23. The term 'grapevine' is also known as : **[June-2015]**
(a) Downward communication
(b) Informal communication
(c) Upward communication
(d) Horizontal communication

24. The choice of communication partners is influenced by factors of **[July-2016]**
(a) Proximity, utility, loneliness
(b) Utility, secrecy, dissonance
(c) Secrecy, dissonance, deception
(d) Dissimilarity, dissonance, deviance

25. Choose the correct sequence of communication from the options given below: **[24th June 2019-Ist Shift]**
(a) Information – exposure – persuasion – behavioural change
(b) Persuasion – Information – behavioural change – exposure
(c) Exposure – Information – persuasion – behavioural change
(d) behavioural change – Information – persuasion – exposure

26. Which of the following is a stage of intrapersonal communication? **[24th June 2019-IInd Shift]**
(a) Phatic stage
(b) Intimate stage
(c) Personal stage
(d) Transcendental communication

27. Which of the following is a characteristic of interpersonal communication? **[25th June 2019-IInd Shift]**
(a) It is both focused and unfocused
(b) It is not participation friendly
(c) It is philosophical
(d) It is metaphorical

28. A customer writes to a bank, 'Kindly send me a statement of my transactions in my savings bank account 'A' during the last three months". In terms of communication it will be called: **[26th June 2019-Ist Shift]**
(a) Input (b) Message
(c) Output (d) Feedback

29. A communication process can be considered complete when: **[26th June 2019-Ist Shift]**
(a) The sender transmits the message
(b) The message enters the channel
(c) The message leaves the channel
(d) The receiver understands the message

30. In the context of communication, usual sequence is: **[26th June 2019-Ist Shift]**
(a) Language → Communication → Society → Civilization
(b) Communication → Society → Language → Civilization
(c) Communication → Language → Society → Civilization
(d) Language → Society → Communication → Civilization

31. Below are given two sets in which Set I describes the types of listener involved in communication, while Set II indicates their characteristics: **[26th June 2019-IInd Shift]**

	Set-I (Types of listener involved in Communication)		**Set-II (Characteristics)**
(1)	Non Listener	(i)	is engaged in information other than the one needed
(2)	Marginal Listener	(ii)	receives information without processing the significance in the context of communication
(3)	Evaluative Listener	(iii)	looks into the relevance of the information for understanding its implication
(4)	Active Listener	(iv)	pays heed to the communicated information occasionally

Match the two sets and give your answer by choosing from the options:

	(1)	**(2)**	**(3)**	**(4)**		**(1)**	**(2)**	**(3)**	**(4)**
(a)	(iv)	(iii)	(ii)	(i)	(b)	(ii)	(iv)	(i)	(ii)
(c)	(ii)	(i)	(iii)	(iv)	(d)	(i)	(iv)	(ii)	(iii)

32. Match the following.

Set – I (Communication elements)	**Set – II (Description of process part)**
(A) Sender	(i) Brain
(B) Receiver	(ii) Electro-magnetic impulses
(C) Message	(iii) The central nervous system
(D) Medium	(iv) Sensory organs

Choose the correct answer from the options given below: **[21st June 2019-Ist Shift]**

	(A)	(B)	(C)	(D)		(A)	(B)	(C)	(D)
(a)	(i)	(iii)	(ii)	(iv)	(b)	(iii)	(i)	(iv)	(ii)
(c)	(iv)	(i)	(ii)	(iii)	(d)	(ii)	(iv)	(iii)	(i)

33. In the analog communication, contents are considered to be: **[21st June 2019-Ist Shift]**
(a) Convergent (b) Static
(c) Physical (d) Ethereal

34. **Assertion (A):** Communication has the power to inform, persuade and misinform.
Reason (R): Propaganda blurs the thin line between truth and falsehood to be persuasive.
Choose the correct answer from the options given below: **[21st June 2019-IInd Shift]**
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A)
(c) (A) is true, but (R) is false
(d) (A) is false, but (R) is true

35. **Assertion (A):** Communication presupposes a shared, symbolic environment, a social relationship even among non-participants.
Reason (R): It leads to social interaction, which in combination with other factors contributes to a sense of community.
Choose the correct option given below: **[24th June 2019-IInd Shift]**
(a) Both (A) and (R) are true and R is the correct explanation of A.
(b) Both (A) and (R) are true but R is not the correct explanation of a.
(c) (A) is true but (R) is false.
(d) (A) is false but (R) is true.

36. Instructional communication in the distance education mode is **[2nd Dec. 2019-Ist Shift]**
(a) unstructured
(b) Self-regulatory
(c) Informal
(d) Structured and interactive

37. The conoept of proximal development, related to educational Communication, was developed by **[3rd Dec. 2019-IInd Shift]**
(a) Sigmund Freud (b) Kurt Lewin
(c) Lev Vygotsky (d) Alberk Bandura

38. In the linear model of communication, the expected result is **[3rd Dec. 2019-IInd Shift]**
(a) Psychological disruption
(b) Removal of physical noise
(c) High level of obstruction
(d) Semantic accuracy

39. Which of the following groups has the components of paralanguage communication? **[4th Dec. 2019-IInd Shift]**
(a) Voice, Emphasis and Impression
(b) Social Space, Voice and Impression
(c) Voice, Social Space and Expression
(d) Emphasis, Social Space and Voice

40. Select the advantage of feedback in the process of communication. fi'om the following : **[4th Dec. 2019-IInd Shift]**
(a) It is beneficial in understanding of the subject matter
(b) It diagnoses the defects in receiver
(c) It clarifies the communication
(d) It explores the defects in receiver

41. Match the following types of communication with their distinguishing examples

Set I (Types of Communication)	Set II (Distinguishing Example)
(A) Formal Communication	(i) Government agencies
(B) Informal Communication	(ii) Circular
(C) Outward Communication	(iii) Memos
(D) Inward Communication	(iv) Group chain

Choose the correct option from those given below: **[5th Dec. 2019-Ist Shift]**
(a) (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)
(b) (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)
(c) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)
(d) (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)

42. Identify the communication which is valid as documentary evidence from the following : **[5th Dec. 2019-Ist Shift]**
(a) Written Communication
(b) Verbal Communication
(c) Gestural Communication
(d) Non - verbal Communication

43. Identify the correct sequence of one way process of communication, from the following sequences **[5th Dec. 2019-IInd Shift]**
(a) Sender, Decoding, Message, Channel, Encoding, Receiver
(b) Sender, Encoding, Message, Channel, Decoding, Receiver
(c) Receiver, Encoding, Message, Channel, Decoding, Sender
(d) Sender, Message, Decoding, Encoding, Channel, Receiver

44. Identify the skills promoted by communication from the following: **[5th Dec. 2019-IInd Shift]**
(A) Reading and listening
(B) Listening and helping
(C) Helping and speaking
(D) Speaking and writing
Choose the correct option:
(a) (A) and (B) only (b) (B) and (C) only
(c) (A) and (D) only (d) (C) and (D) only

45. When a large number of students with different performances levels are there in the class. For uniform imparting of educative interactions, a teacher should opt for a communication which is: **[6th Dec. 2019-Ist Shift]**
(a) Top-down and linear (b) Technology – enabled
(c) Individual – centric (d) Self – projected

46. Swapping of encoder- decoder roles in communication happens due to **[6th Dec. 2019-Ist Shift]**
(a) Cognitive disruptions (b) Semantic noise
(c) Feedback analysis (d) Weak channelization

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HINTS & EXPLANATION

1. (c) While establishing communication one should keep in mind the psychophysical condition of the person who communicates.

2. (c) Mediated communication refers to communication carried out by the use of information communication technology, and can be contrasted to face-to-face communication.

3. (a) Statistics is an analyst's concern, while proof, an investigator's. Repetition of facts undermines effectiveness of communication.

4. (a) Communication involves perception and exchange of verbal as well as non verbal messages that require use of all senses.

5. (d) Interpersonal communication is an exchange of information between two or more people, technically face to face, but now including social media, with the changing scenario.

Orkut was a social networking website owned and operated by Google. It was created by and named after a Turkish software engineer, Orkut Büyükkökten, working with Google. It was designed to serve as a virtual forum for users to communicate with old friends and new, and forge relationships. Orkut was one of the most visited websites in India and Brazil in 2008.

6. (a) the decoder becomes an encoder

Circular communication is a two way process where the sender can deliver one message and then become the receiver, getting another message.

7. (b) Organizational communication takes place in business environments. Relational communication encompasses communication processes in personal relationships such as romantic relationships, family relationships, and friendships. Interpersonal communication is the process by which people exchange information, feelings, and meaning through verbal and non-verbal messages: it is face-to-face communication. Intrapersonal communication is a communicator's internal use of language or thought.

Didactic communication which intends to indoctrinate the audience or instruct theoretical knowledge is the common communication in classrooms. From the explanations above, it is clear that it is interpersonal.

Dialectical method is a discourse between two or more people (interpersonal) holding different points of view about a subject but wishing to establish the truth through reasoned arguments.

Socratic debate is a form of cooperative (interpersonal) argumentative dialogue between individuals, based on asking and answering questions to stimulate critical thinking and to draw out ideas and underlying presuppositions.

8. (d) Communication process includes seven elements: Source, Encoding, Channel, Decoding, Receiver, Feedback, Context.

9. (d) 'Myth' is a traditionally held false belief or idea; 'reason' is the argument provided for substantiating/validating an idea; 'experience' is practical contact with, or observation of, facts or events; 'conviction' is a firmly held belief or opinion based on experience or reason.

When stereotypes that have been established as conventions or norms in a society get communicated further, they become strongly held convictions.

10. (c) Public communication is a one-to-many form of communication wherein a single speaker addresses a large audience; or, individuals and groups interact in the public sphere in order to convey a message to a specific audience. Such communication is generally non-formal, non-political and simple rather than complex, taking place in a convenient structure.

Public communication happens when. Common forms of public communication are public speaking events, panel discussions, newspaper editorials, billboard advertisements, etc.

11. (d) Intrapersonal communication is a conversation which you have with yourself or which a person has inside with Self. Saying affirmations to yourself or talking yourself through your fears are two examples of this kind of communication.

12. (b) While designing communication strategy feed-forward studies are conducted by Communicator. A person who is able to talk about his/ her ideas and emotions in a way that other people understand is called Communicator.

13. (c) Interpersonal communication happens between persons; mass communication happens when newspaper, radio or other media are used to communicate with the masses; face to face communication requires physical presence of the two communicating parties at one place; and, group communication happens when members of a group communicate among themselves. The teacher communicates with the class group in an interactive teaching session. Such group communication also takes place in business organisations.

14. (a) Mass line communication is the way in which Mao directed the Chinese government and the Communist Party to receive ideas from the masses (the general population of workers) and create policies that would fulfil their needs.

15. (a) The English word 'Communication' is derived from the words Communis and Communicare.

16. (c) In the process of communication, chronological order is – Communicator, Message, Medium, Receiver, Effect.

17. (b) Grapevine is an informal, unofficial and personal channel of communication which stretches in all directions irrespective of the authority levels, despite the existence of formal channels. It is a complex web of oral information flow linking all the members of the organization, though it exists more at lower levels of organization.

18. (a) Linear communication is a one-way process conducted in a straight line (linear way) toward the main point. Here, the sender is more important, encoding and transmitting the message through a channel in the presence of noise; and the receiver only decoding the information without giving feedback or response.

Non-linear communication is one that is not in a straight line. It is interactive.

Circular communication is conducted in a circular manner around the main point. The point may be left unstated because the verbal and nonverbal information provided is sufficient for understanding.

Mechanised communication is one that typically includes written or electronic communications and can be used as an archive for messages.

19. (d) Receivers are not just passive absorbers of messages; they receive the message and respond to them. This response of a receiver to sender's message is called Feedback. Feedback is your audience's response; it enables you to evaluate the effectiveness of your message.

20. (b) Mass communication is the process of transmitting information, thoughts and opinions, entertainments, etc., at a time, to a large number of heterogeneous audiences scattered far from the source of information, through media such as radio, television, newspaper, magazine, and leaflets.

Intrapersonal communication is a communicator's internal use of language or thought.

Interpersonal communication is exchange of information, feelings, and meaning through verbal and non-verbal messages in a face-to-face communication between people.

Group communication refers to the exchange of messages, verbal or nonverbal, among members of a group for the purpose of participation, motivation, determining goals, etc., that maintain group identity and keep the group intact.

21. (d) (A) is false but, (R) is correct.

Formal communication is generally in written form. It is authoritarian in nature and hardly flexible. It flows in a systematic and orderly fashion in the upward or downward direction; and is not fast unlike informal communication that spreads like fire.

22. (d) (A), (B), (C) and (D)

The characteristic features of communication are:

1. Has specific objectives to be met
2. Requires two or more person/parties
3. Involves exchange of information between sender and receiver
4. Makes use of media/channel
5. Is a dynamic process
6. May face noise/barriers that distort the meaning of the message.
7. Essentially includes feedback, i.e., response of the receiver to the sender

23. (b) Grapevine communication is informal workplace dialogue in its purest form. it is the spontaneous exchange of information between two or more persons at different status, specifically between employees and superiors, without adhering to any prescribed or official rules, formalities and chain of command in the organizational structure. Grapevine communication spreads rapidly and likely touches each person throughout the organization.

Vertical (Downward or Upward) and Horizontal communication are types of formal communication.

24. (a) People tend to talk when they are lonely; or if they are seeking an outcome; and, choose the one to whom they are close.

Secrecy, dissonance, deception, dissimilarity and deviance are factors that dissuade people from entering into a conversation.

25. (c) Communication **exposes** facts, opinions, etc., before communicators; this leads to travel of **information** to them; information **persuades** the communicators to form certain views and adopt certain attitudes; which leads to **change in their behaviour**.

26. (d) Intrapersonal communication takes place within an individual. It has three aspects: self concept, perception and expectation. Self-concept (or self-awareness) as well as perception of the outside world involves beliefs, values and attitudes that mould behaviour; while expectations are future-oriented messages pertaining to long-term roles and relationships within the family or society. It happens at three levels/ stages: internal discourse (silent prayer/appreciation, contemplation, meditation/ **transcendence**); solo vocal communication ; and, solo written communication.

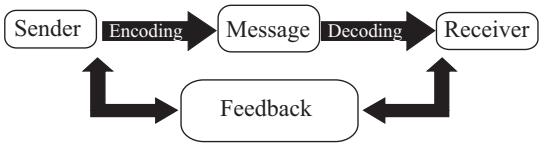
Phatic, intimate and personal are stages in interpersonal communication.

27. (a) Interpersonal communication is a two-way, face-to-face communication in which people exchange information, feelings, and meaning through verbal and non-verbal messages. It may be focused or unfocussed on different occasions. It involves good participation of both parties in a formal or informal manner. It is not philosophical (which is one way) nor metaphorical (which hinders reception) as it involves minimal barriers to communication.……

28. (b) This is clearly the first point of communication or a message, not a feed back of any delivered message. Input and output figure in "Man-machine interaction"; man talking to computers with programs, applications and drivers assigning them work to be done (input) and they, responding with solutions (output).

29. (d) As the figure below depicts, the communication process is complete only when the receiver decodes or understands the sent message.

How the Communicatio Process Works



30. (c) The desire to communicate was the main drive behind language making, which itself was incident upon social life and cultural growth. During the stone ages, the communication was in a nascent stage. Communication with the aid of runners, birds, arrows, smokes and shouting was replaced with signs and non-verbal communication via cave paintings, petro glyphs, ideograms and pictograms which gradually made way for different kinds of verbal methods of communication.

The technological innovations of the nineteenth century and later – post and telegraph, telephone, phonograph, photography, newsprint, motion pictures, fibre optic, radio, television, computer, internet, social media, and so on, have powerfully changed the way humans communicate with each other.

31. (d) Non-listeners make no effort to listen; they interrupt and are distracted with information not relevant.

Marginal listeners pays heed only occasionally, hence, take in only the surface and not the depth of the message.

Evaluative listeners start evaluating the ideas of the speaker and hence the significance of the context of message is lost to them.

Active listeners listen intently and pay attention to the relevance/context of the message to understand its implication.

32. (c) A-iv, B-i, C-ii, D-iii

The sender uses his/her **sensory organs** to process the message.

The receiver processes the message in the **brain** to understand it.

The message is a sensory input carried as **electromagnetic impulses** by axons, neurons, dendrites to the brain where it triggers a chemical reaction to process it in accordance with the physical and psychological make-up of the receiver.

The central nervous system consisting of the brain and the spinal cord is the **medium** by means of which the message is transmitted between the sender and the receiver.

33. (b) Analog communication is one-way continuous signal for which the time-varying feature (variable) of the signal is a representation of some other time varying quantity, i.e., analogous to another time varying signal . Here the contents can be only linear and static not dynamic.

34. (a) Communication is the process of imparting or exchanging information by any medium. This information can be true or untrue/misleading (misinformation) and could serve the purpose of dissuading or persuading certain behaviours. So, A is true. Propaganda is a kind of communication that serves the purpose of assertively spreading biased or misleading information to the extent that it persuades receivers to believe it as truth. So, R is the correct explanation of A.

35. (d) Communication means sharing or exchanging of information, news, ideas, etc. by speaking, writing, or using some other medium. The most common medium of communication is language, though we also use non-linguistic symbols such as traffic lights, road signs, railway signals, airport signs for travelling, telegraphic code for quick transmission of messages and secret defence services codes. Communication always happens between/among participants. So Assertion (A) is not true.

"Communication leads to community, that is, to understanding, intimacy and mutual valuing," said psychologist Rollo May. Communication allowed for cultures to evolve. Communication is a never ending process that continues when the words stop and the interaction ends. So, the statement in (R) is true.

36. (d) The third generation of distance education uses ICT making its modules electronic and computer-based; and interactive as it enables communication between learners and teachers as well as learners and learners.

37. (c) Zone of proximal development, now called the zone of potential development (ZPD) is a term that Vygotsky used to explain the range of development in learners. He postulated that every individual has two levels of development: a lower level that is attainable under normal circumstances and an upper level attainable under the influence of an adult or capable peer; the difference between these two levels being the ZPD. This postulation manifests Vygotsky's belief in the importance of social influences, especially instruction, on children's cognitive development.

38. (d) Linear model of communication is a one-way communication process which does not include feedback, or the feedback is quite delayed. Since there is no feedback, the level of cognition is unperceivable and the only result expected is semantic accuracy from the encoder/teacher. Psychological disruption and high level of obstruction are not applicable as it is one-way communication; removal of physical noise cannot be ensured as it is teacher-centric and learners are not involved.

39. (a) There are 8 different types of non-verbal communication

(a) Social space
(b) Time
(c) Physical characteristics
(d) Body movements
(e) Touch
(f) Paralanguage
(g) Artifacts
(h) Environment

Of these, paralanguage constitutes the following:

(i) **Voice quality**, e.g., sweet, soft, musical, cultivated, pleasant, nasty, clear or indistinct, among other things; it reveals a speaker's background, mental state, education, sex and temperament.

(ii) **Word stress** or optimum emphasis on the right words for right effect.

(iii) **Intonation** or the modulation of the voice and the shift in stress; e.g., a message with serious content is delivered in a sombre rather than high tone.

(iv) **Pitch** or the vocal slant of the voice; it reveals the speaker's frame of mind, e.g., an unusually high pitch may reflect agitation, an unchanging pitch may get monotonous. The pitch also indicates the speaker's social position; e.g., a person in a position of authority uses a higher pitch than a subordinate.

(v) **Pause** which is akin to punctuation in prose; it introduces variety, and lays emphasis on a message; used at the wrong place, it may lead to miscommunication.

(vi) **Volume variation** of voice to suit the size of the audience; the larger the audience, the louder the voice must be to be audible and effective.

(vii) **Mixed signals** which occur when the tone, pitch and facial expressions of the speaker do not match the spoken words, and confuse the listener about the speaker's intent; e.g., praise delivered in a sarcastic tone will amount to ridicule.

(viii) **Overall impression** or the speaker's manner, attitude, dressing style, physical appearance, etc., which contribute much to the audience perception.

40. (c) Feedback is the reverse flow of the **decoded** (understood) message to the sender. So, it cannot be beneficial in understanding, nor does it diagnose or explore the defect in the receiver. It clarifies the communication by informing the sender to what degree his/her message has been understood so that he/she can modify it further.

41. (a) (A)-(iii), (B)-(iv), (C)-(i), (D)-(ii)

Formal communication is smooth, orderly, accurate and timely flow of information through official channels along officially recognized positions; memo or memorandum is official communication serving as a reminder or giving some instruction.

Communication with the outside world including government agencies, media, etc., is called outward communication.

Informal Communication is casual, spontaneous, unofficial exchange between two or more persons; which travels in the form of group chain.

Inward communication includes all the information received by the organisation from external agencies; it travels in a circular channel inside.

42. (a) Gestural and non-verbal communication include signals and cues without the use of words.

Verbal communication includes the spoken (oral) and written words. Written communication is a formal method of communication and is inflexible. As per Chapter VI of Indian Evidence Act, 1872 deals with exclusion of oral evidence by documentary evidence. Oral verbal evidence of a witness can be considered doubtful if it is in contradiction with the previous statement. Documents once put into writing are considered to be the best evidence. The very object for which writing is used is to perpetuate the memory of what is written down, and so to furnish permanent proof of it. Section 62 of the Evidence Act makes it clear that primary evidence is the document itself. A "document", as defined in Section 3 of the Act, is any matter which is expressed or described on any substance by means of letters, figures or remarks or by more than one means and which can be used for recording the matter.

43. (b) One-way process of communication travels from the sender to the receiver without any feedback to the sender. The sequence is: Sender Encodes the Message which travels through the Communication Channel and gets Decoded (understood) by the Receiver.

44. (c) Communication involves listening and speaking in the oral form ; and reading and writing in the scripted form.

45. (b) Technology enabled communication is most suited for uniform imparting of educative interactions. As such, it travels uniformly from the source and reaches every member of the audience regardless of their individual differences.

Top down and linear communication style is suitable in organisations with multiple levels in hierarchy. Clasroom teaching has only two levels–the teacher and the taught. Hierarchy in terms of performance levels is non-inclusive and undesirable in a class.

Individual centric communication may challenge the teacher to ensure that every student in the class has received the information imparted, particularly when the class size is large. Individual differences among students would mean that some lag behind and fail to receive the communication.

likewise, communication sel-projected by the teacher might fail to reach some students particularly when the class is largc.

46. (c) This can be understood in terms of teaching-learning in an educational institution.

In the classroom the teacher is the encoder of messages and the student, the decoder.

After the teaching, the encoder/teacher takes the feedback in the form of students' response-sheets to an assessment exercise/test. When the encoder takes up the activity of analysing the feedback, i.e., checking/ evaluating the responses, the roles of encoder-decoder stand swapped. Here, the students have encoded messages that the teacher has to decode.

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CHAPTER 15

Effective Communication

FEATURES OF EFFECTIVE COMMUNICATION

i. Common frame of reference

The sender and the receiver should interact at a common level of understanding.

ii. Mutual Interest

Contents of Communication should be of mutual interest to the sender and the receiver.

iii. Common language

Verbal interaction between the sender and the receiver is easy and effective if they speak a common language.

The possibilities of incomplete communication are minimised because words, phrases, idioms, proverbs and their nuances are easily understood.

iv. Common environment

People with a similar background receive the intended message without any hassles.

THE CHARACTERISTICS OF EFFECTIVE COMMUNICATION

1. Clarity of Purpose
2. Completeness
3. Conciseness
4. Feedback
5. Empathy
6. Modify the message according to the audience
7. Multiple Channels of communication

STRATEGIES FOR EFFECTIVE COMMUNICATION

i. Clarity of message
ii. Reinforcement of ideas
iii. Appropriate channel
iv. Motivation
v. Proper environment

FUNCTIONS OF COMMUNICATION

Information
Instruction
Entertainment
Persuasion
Debate and discussion
Cultural Promotion
Integration

VERBAL COMMUNICATION

Verbal communication is the use of language to transfer information through speaking or sign language.

The sender gives words to his feelings, thoughts, ideas and opinions and expresses them in the form of speeches, discussions, presentations, and conversations.

The effectiveness of the verbal communication depends on the tone of the speaker, clarity of speech, volume, speed, body language and the quality of words used in the conversation.

Division of verbal communication

Verbal communication is subdivided into Oral and Written Communication. Verbal communication is subdivided into Oral and Written Communication.

i. Oral Communication

1. Meaning
2. Principles
3. Features
4. Merits
5. Demerits

Difference Between Oral and Written Communication

Oral Communication	Written Communication
1. Use of non-verbal language like body language is a must	1. Use of nice layout and presentation is required.
2. Fast in conveying the intended message	2. Comparatively slower in conveying the intended message.
3. More personal touch and impact on receiver	3. Less personal touch and impact on receiver.
4. Immediate feedback	4. Delayed feedback.
5. Less thoughtful	5. More deliberate and thoughtful
6. Receiver may forget the message after some time	6. The message is always available for future reference
7. Lengthy	7. Comparatively precise
8. Oral communication is suitable for conveying emotions and feelings	8. Written communication is suitable for conveying fact and figures.

TYPES OF VERBAL COMMUNICATION

I. Intrapersonal Communication

This form of communication is extremely private and restricted to ourselves or self-talk. It includes the silent conversations we have with ourselves, wherein we juggle roles between the sender and receiver who are processing our thoughts and actions. This process of communication when analyzed can either be conveyed verbally to someone or stay confined as thoughts. From planning to problem solving, internal conflict resolution, and evaluations and judgments of self and others, we communicate with ourselves through intrapersonal communication. All this interaction takes place in the mind without externalization, and all of it relies on previous interaction with the external world

II. Interpersonal Communication

Interpersonal communication is the two-way process of sending and receiving information between two or more people on a one-on-one basis. It takes place when one person communicates with another person, face to face or via telephone, e-mail, letters or meetings. to exchange ideas, feelings and thoughts through verbal and non verbal messages.

- **Indirect or Mediated** interpersonal communication involves technology that assists or links the sender and receiver of messages. Telephonic conversation, internet chatting, and video talk are examples of mediated interpersonal communication.

Principles of Interpersonal Communication

1. Inescapable
2. Irreversible
3. Complicated
4. Contextual

Functions of Interpersonal Communication

1. Gaining Information
2. Building Understanding
3. Establishing Identity
4. Interpersonal Needs

Features of Good Interpersonal Communication

1. Being open Minded
2. Getting over self
3. Understanding others
4. Keeping Your Doors Open
5. Being Thankful
6. Listening actively
7. Being appreciative
8. Communicating clearly
9. Not Complaining
10. Spontaneity: In response
11. Focussing on the present
12. Authenticity in expression
13. Self-Disclosure
14. Empathy: for others
15. Acceptance of the other
16. Warmth for other
17. Trust on others
18. Acceptance of others Feelings

Ethical Communication

Basics	• Ethical communication means being truthful at all times. • Questions of right and wrong arise whenever people communicate. • It requires that communicator should have good critical skills, respect for all and feeling of responsibility. • Ethical communication is fundamental to responsible thinking, decision making, and the development of relationships. • Moreover, ethical communication enhances human worth and dignity by fostering truthfulness, fairness, responsibility, personal integrity, and respect for self and others.
Importance of ethical communication	• Ethical communication is of utmost importance in proper and responsible decision making. • It helps in maintaining good relationships. • It requires good qualities like truthfulness, integrity and objectivity etc. Thus, it results in self development as well. • Moreover, it creates a positive corporate image. • If an organisation performs unethical business practices, the consumer will lose trust in the organisation and its products, and there will be no customers in the long run. • Competent personnel prefer to be associated with an organisation which is known for its ethical values. • Unethical communication leads to business failure and loss to the investors. Thus, it is necessary to maintain ethical values in communication. • If an entity maintains ethical values, the Government intervention will be less.

iii. Group Communication

Group communication is a dynamic process where three to eight people engage in a conversation.

Kinds of Groups

Primary groups are those which are composed of individuals with intimate, personal relations and who interact face to face, figuratively and not literally.

Examples of primary group are: family, play groups, kinship groups, labour groups, clan, etc.,

Secondary groups are all those in which individuals have formal, impersonal and status relations. Political parties, associations, labour unions, religious groups etc. are considered secondary group. Every individual is a member of primary as well as secondary group at one and same time.

IV. Public Communication

Public communications is the receipt and exchange of messages, ideas and opinions. Contributing to and shaping public discourse.

NON-VERBAL COMMUNICATION

Non-verbal communication is the use of body language, gestures and facial expressions to convey information to others. It can be used both intentionally and unintentionally. Nonverbal communication is also

Components of Non-Verbal Communication

Kinesics	• Kinesics is the interpretation of non-verbal behavior related to movement, either of any part of the body or the body as a whole. Body movements include gestures, facial expressions and other physical movements.
Oculesics	• It is the study of the role of eye contact in non verbal communication.
Chronemics	• Chronemics is the study of the use of time in nonverbal Communication.
Proxemics	• Proxemics is the technical term for the personal space aspect of body language.
Haptics	• Haptics refers to the study of non-verbal communication by touch.
Paralanguage or Paralinguistics	• Paralanguage refers to the non-verbal elements of communication used to modify meaning and convey emotion; and it includes the pitch, volume, and, in some cases, intonation of speech.

INTER-CULTURAL COMMUNICATIONS

Intercultural communication takes place when culturally diverse people interact.

There are now an increasing number of intercultural contacts leading to communication between people from diverse linguistic and cultural backgrounds. This communication occurs as a result of intercultural contacts such as in the field of business, mass media, science and education.

BARRIERS /OBSTACLES TO EFFECTIVE INTERCULTURAL COMMUNICATION

Obstacles to effective intercultural communication include attitudes and dispositions, stereotyping, and ethnocentrism.

i. Attitudes and Dispositions

Teachers' interpersonal communication behavior in the classroom is known to be one of a vital element in creating a classroom learning environment that significantly contribute towards the students' attitudes and motivation of learning.

ii. Stereotyping

To engage students effectively in the learning process, teachers must know their students and their academic abilities individually, rather than relying on racial or ethnic stereotypes or prior experience with other students of similar backgrounds.

iii. Ethnocentrism

"Ethnocentrism" is a commonly used word in circles where ethnicity, inter-ethnic relations, and similar social issues are of concern. It refers to judging other groups from our own cultural point of view.

CLASSROOM COMMUNICATION

Classroom is a place of communication in group situations. Teaching is a social activity that involves both the teacher and the learner and communication is an integral part of the teaching-learning process. It is therefore important, that two-way communication exists between them in order to trigger learning. Moreover, direct communication between a teacher and learners allows the teacher to get immediate feedback that can help him/her gauge learners, understanding of what has been taught. Based on such feedback the teacher can improve his/her communication.

Individual Instruction

Interpersonal communication between two persons offers maximum interactivity.

Small Group Instruction

- Small groups consisting of 15-20 learners are more conducive for teaching and skill development.

Large Group Instruction

- Lecture method is generally used for providing instructions to large groups.
- Information and Communication Technology is being increasingly used to meet the needs of large and dispersed classes in same or different locations.

CHANNELS OF CLASSROOM COMMUNICATION AND LEARNING

Downward Communication in Teaching Learning

- It is a communication flow from the classroom teacher to the classroom students.
- The language here is formal and the tone is specific in bringing about understanding and instructions and relationships in the classroom.

Upward Communication in Teaching Learning

- In the classroom, upward communication is concerned with the communication that emanates from the students to the teacher.
- It serves as a channel through which the class-room students make known to their teachers the extent to which learning has taken place through the questions they responded to or ask from the teacher in the classroom.

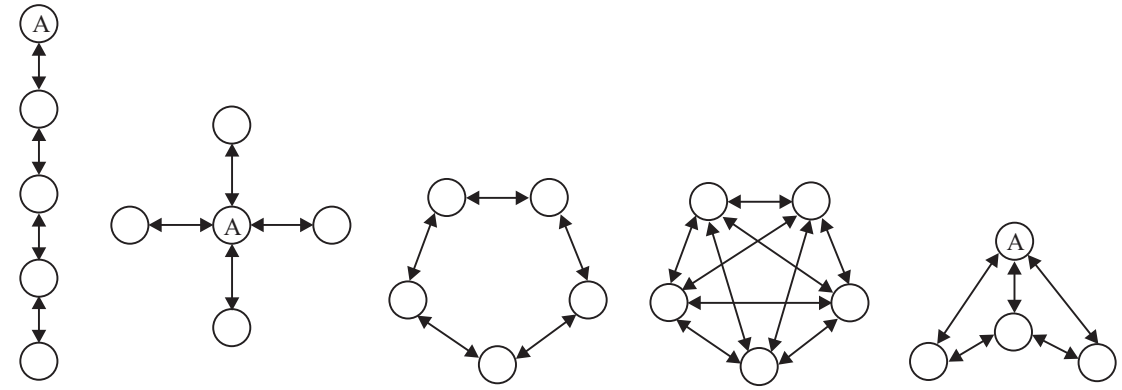
Horizontal Communication in the Classroom

In the classroom situation, horizontal communication takes place among and between the students. It occurs in their various learning interactions and discussions.

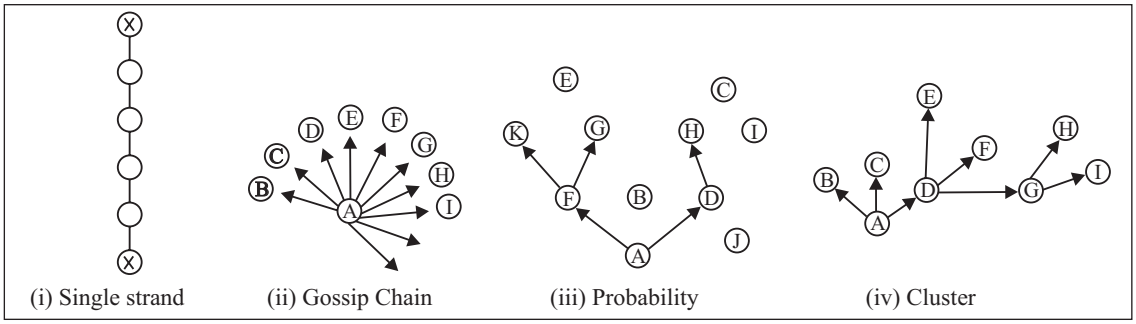
Informal Channels of Communication

- In teaching and learning that takes place in the classroom, this can take a form of advice, information, discussion, gossips and rumour otherwise called the 'grape vine'.

Formal Channels of Communication



Informal Channels of Communication



EXERCISE

1. In the process of establishing communication between the newspapers and the readers, feedback is received from **[June-2005]**
(a) Articles (b) Editorials
(c) Letters to the editors (d) Newspapers

2. For effective communication, which of the following should be given priority? **[June-2005]**
(a) Selection of the means of communication
(b) Planning of the evaluation process
(c) Objectives of the communication
(d) Identification of the various means of communication

3. Level C of the effectiveness of communication is defined as: **[December-2005]**
(a) channel noise (b) semantic noise
(c) psychological noise (d) source noise

4. Communications bandwidth that has the highest capacity and is used by microwave, cable and fibre optics lines is known as : **[December-2005]**
(a) hyper-link (b) broadband
(c) bus width (d) carrier wave

5. Which one of the following can be termed as verbal communication? **[December-2006]**
(a) Prof. Sharma delivered the lecture in the class room.
(b) Signal at the cross-road changed from green to orange.
(c) The child was crying to attract the attention of the mother.
(d) Dipak wrote a letter for leave application.

6. Communication with oneself is known as: **[June-2008]**
(a) Group communication
(b) Grapevine communication
(c) Interpersonal communication
(d) Intrapersonal communication

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7. In communication chatting in internet is : **[June-2009]**
(a) Verbal communication
(b) Non-verbal communication
(c) Parallel communication
(d) Grapevine communication

8. The chronological order of non-verbal communication is **[December-2009]**
(a) Signs, symbols, codes, colours
(b) Symbols, codes, signs, colours
(c) Colours, signs, codes, symbols
(d) Codes, colours, symbols, signs

9. In communication, the language is **[June-2010]**
(a) the non-verbal code (b) the verbal code
(c) the symbolic code (d) the iconic code

10. In communication, connotative words are **[December-2010]**
(a) explicit (b) abstract
(c) simple (d) cultural

11. Effective communication needs a supportive **[June-2011]**
(a) economic environment
(b) political environment
(c) social environment
(d) multi-cultural environment

12. Transforming thoughts, ideas and messages into verbal and non-verbal signs is referred to as **[June-2011]**
(a) channelisation (b) mediation
(c) encoding (d) decoding

13. Interaction inside the classroom should generate **[December-2012]**
(a) Argument (b) Information
(c) Ideas (d) Controversy

14. Classroom communication must be **[December-2012]**
(a) Teacher centric (b) Student centric
(c) General centric (d) Textbook centric

15. Classroom communication of a teacher rests on the principle of **[December-2012]**
(a) Infotainment (b) Edutainment
(c) Entertainment (d) Power equation

16. Conversing with the spirits and ancestors is termed as **[December-2012]**
(a) Transpersonal communication
(b) Intrapersonal communication
(c) Interpersonal communication
(d) Face-to-face communication

17. _____ is important when a teacher communicates with his/her student. **[June-2013]**
(a) Sympathy (b) Empathy
(c) Apathy (d) Antipathy

18. Classroom communication of a teacher rests on the principle of **[June-2013]**
(a) Infotainment (b) Edutainment
(c) Entertainment (d) Enlightenment

19. Successful Communication in classroom teaching is **[September-2013]**
(a) Circular (b) Reciprocal
(c) Directional (d) Influential

20. Classroom communication is normally considered as **[September-2013]**
(a) effective (b) affective
(c) cognitive (d) non-selective

21. The communicated knowledge in a classroom is considered as **[September-2013]**
(a) non-pervasive treasure (b) limited judgement
(c) autonomous virtue (d) cultural capital

22. Internal communication within institutions is done through **[December-2013]**
(a) LAN (b) WAN
(c) EBB (d) MMS

23. Organisational communication can also be equated with **[December-2013]**
(a) intra-personal communication.
(b) inter-personal communication.
(c) group communication.
(d) mass communication.

24. In communication, myths have power, but are **[December-2013]**
(a) uncultural. (b) insignificant.
(c) imprecise. (d) unpreferred.

25. Classroom communication can be described as **[December-2013]**
(a) Exploration (b) Institutionalisation
(c) Unsignified narration (d) Discourse

26. Classroom communication is normally considered as **[June-2014]**
(a) effective (b) cognitive
(c) affective (d) selective

27. The Telephone Model of Communication was first developed in the area of **[June-2014]**
(a) Technological theory (b) Dispersion theory
(c) Minimal effects theory (d) Information theory

28. Break-down in verbal communication is described as **[June-2014]**
(a) Short circuit (b) Contradiction
(c) Unevenness (d) Entropy

29. In the classroom, the teacher sends the message either as words or images. The students are really **[December-2014]**
(a) Encoders (b) Decoders
(c) Agitators (d) Propagators

30. In communication, the language is : **[June-2015]**
(a) The verbal code (b) Intrapersonal
(c) The symbolic code (d) The non-verbal code

31. Effectiveness of communication can be traced from which of the following? **[June-2015]**
(A) Attitude surveys
(B) Performance records
(C) Students attendance
(D) Selection of communication channel
Select the correct answer from the codes given below :
(a) (A), (B), (C) and (D) (b) (A), (B) and (C)
(c) (B), (C) and (D) (d) (A), (B) and (D)

32. Which of the following is not a principle of effective communication? **[June-2015]**
(a) Persuasive and convincing dialogue
(b) Participation of the audience
(c) One-way transfer of information
(d) Strategic use of grapevine

33. In a classroom, a communicator's trust level is determined by : **[December-2015]**
(a) the use of hyperbole
(b) the change of voice level
(c) the use of abstract concepts
(d) eye contact

34. Most often, the teacher - student communication is: **[December-2015]**
(a) Spurious (b) Critical
(c) Utilitarian (d) Confrontational

35. Every type of communication is affected by its : **[December-2015]**
(a) Reception (b) Transmission
(c) Non-regulation (d) Context

36. Attitudes, actions and appearances in the context of classroom communication are considered as: **[December-2015]**
(a) Verbal (b) Non-verbal
(c) Impersonal (d) Irrational

37. Aspects of the voice, other than the speech are known as : **[December-2015]**
(a) Physical language (b) Personal language
(c) Para language (d) Delivery language

38. Using the central point of the classroom communication as the beginning of a dynamic pattern of ideas is referred to as: **[December-2015]**
(a) Systemisation (b) Problem - orientation
(c) Idea protocol (d) Mind mapping

39. Identify the important element a teacher has to take cognizance of while addressing students in a classroom. **[July-2016]**
(a) Avoidance of proximity (b) Voice modulation
(c) Repetitive pause (d) Fixed posture

40. Imagine you are working in an educational institution where people are of equal status? Which method of communication is best suited and normally employed in such a context ? **[July-2016]**
(a) Horizontal communication
(b) Vertical communication
(c) Corporate communication
(d) Cross communication

41. Every communicator has to experience **[July-2016]**
(a) Manipulated emotions (b) Anticipatory excitement
(c) The issue of homophiles (d) Status dislocation

42. As a teacher, select the best option to ensure your effective presence in the classroom. **[July-2016]**
(a) Use of peer command
(b) Making aggressive statements
(c) Adoption of well-established posture
(d) Being authoritarian

43. Which of the following are the basic factors of effective listening? **[August-2016]**
(a) Opinionation, stare and glare and interruptions
(b) Aggressive questioning, continuous cues and frequent movement
(c) Me-too-ism, glancing sideways, and offering advice
(d) Acknowledgement of thoughts, reflection, and asking open-ended questions

44. Figure out the components of non-verbal communication in a classroom from the following : **[August-2016]**
(a) Facial expression, cultural space and seating arrangement
(b) Speed of utterance, feel good factor and acoustics
(c) High sound, physical ambience and teacher-learner distance
(d) Facial expression, kinesics and personal space

45. As a good classroom communicator, you are supposed to know your **[August-2016]**
(a) audience emotions (b) silent cues
(c) artful pauses (d) counter arguments

46. What do communicated words carry in a classroom situation? **[August-2016]**
(a) Inspiration, controversy and introspection
(b) Diversion, criticism and irrationality
(c) Insipidity, irrationality, and non-acceptance
(d) Power, structure and tradition

47. A teacher in a classroom has immediate control over **[August-2016]**
(a) the self, selected methods of communication and the message.
(b) the audience, the noise and the reception.
(c) the feedback, the technology and the audience experience.
(d) the communication channel, other communicators, and external factors.

48. Internal and external factors that affect message reception by the students in the classroom are referred to as **[August-2016]**
(a) feedback (b) fragmentation
(c) channelization (d) noise

49. Positive classroom communication leads to **[January-2017]**
(a) Coercion (b) Submission
(c) Confrontation (d) Persuasion

50. Expressive communication is driven by **[January-2017]**
(a) Passive aggression
(b) Encoder's personality characteristics
(c) External clues
(d) Encoder-decoder contract

51. The typical feature of an information-rich classroom lecture is in the nature of being **[January-2017]**
(a) Sedentary (b) Staggered
(c) Factual (d) Sectoral

52. Classroom communication is the basis of **[January-2017]**
(a) Social identity (b) External inanities
(c) Biased passivity (d) Group aggression

53. When verbal and non-verbal messages are contradictory, it is said that most people believe in **[January-2017]**
(a) indeterminate messages (b) verbal messages
(c) non-verbal messages (d) aggressive messages

54. Effective communication pre-supposes **[January-2017]**
(a) Non-alignment (b) Domination
(c) Passivity (d) Understanding

55. A good communicator begins his/her presentation with a : **[November-2017]**
(a) Complex question (b) Non-sequitur
(c) Repetitive phrase (d) Ice-breaker

56. The classroom communication should essentially be : **[November-2017]**
(a) Contrived (b) Empathetic
(c) Abstract (d) Non-descriptive

57. The spatial audio reproduction in a classroom can reduce the students' : **[November-2017]**
(a) Cognitive load in understanding
(b) Respect for the teacher
(c) Motivation for excellence
(d) Interest in technology - orientation

58. The interaction between a teacher and students creates a zone of proximal : **[November-2017]**
(a) Difference (b) Confusion
(c) Development (d) Distortion

59. Which of the following set of statements is correct for describing the human communication process ? **[July-2018]**
(A) Non-verbal communication can stimulate ideas.
(b) Communication is a learnt ability.
(c) Communication is not a universal panacea.
(d) Communication cannot break-down.
(e) More communication means more effective learning by students.
(f) Value of what is learnt through classroom communication is not an issue for students.
Code :
(a) (a), (c), (e) and (f) (b) (b), (d), (e) and (f)
(c) (a), (b), (c) and (d) (d) (a), (d), (e) and (f)

60. Differentiation between acceptance and non-acceptance of certain stimuli in classroom communication is the basis of: **[July-2018]**
(a) selective expectation of performance
(b) selective affiliation to peer groups
(c) selective attention
(d) selective morality

61. **Assertion (A) :** Classroom communication is a transactional process. **[July-2018]**
Reason (R) : A teacher does not operate under the assumption that students' responses are purposive.
Select the correct code for your answer :
(a) Both (A) and (R) are true, and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
(c) (A) is true, but (R) is false.
(d) (A) is false, but (R) is true.

62. **Assertion (A) :** To communicate well in the classroom is a natural ability. **[July-2018]**
Reason (R) : Effective teaching in the classroom demands knowledge of the communication process.
Code :
(a) Both (A) and (R) are true, and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
(c) (A) is true, but (R) is false.
(d) (A) is false, but (R) is true.

63. **Assertion (A) :** The initial messages to students in the classroom by a teacher need not be critical to establish interactions later. **[July-2018]**
Reason (R) : More control over the communication process means more control over what the students are learning.
Code :
(a) Both (A) and (R) are true, and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
(c) (A) is true, but (R) is false.
(d) (A) is false, but (R) is true.

64. **Assertion (A) :** Making good predictions in classroom communication may become difficult. **[December-2018]**
Reason (R) : It happens when interactions with students takes place at superficial level.
(a) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
(b) Both (A) and (R) are true.
(c) (A) is false, but (R) is true.
(d) (A) is true, but (R) is false.

65. It is estimated that the meaning derived by the students from non-verbal communication in relation to verbal communication is _____ more. **[December-2018]**
(a) 2/3 (b) 1/6
(c) 1/3 (d) 2/7

66. Iconic production of classroom communication includes: **[December-2018]**
(a) E-mail (b) Graphics
(c) Telephone (d) Scripting

67. Feedback makes the classroom communication process: **[December-2018]**
(A) Linear (B) Circular
(C) Complete (D) Interactive
(E) Disorganised
Code:
(a) (B), (C) and (D) (b) (E), (A) and (B)
(c) (C), (D) and (E) (d) (D), (E) and (A)

68. The primary bases of inter-personal power in relation to classroom communication are : **[December-2018]**
(A) Coercive power
(B) Reward power

(C) Referent power
(D) Legitimate power
(E) Recreational power
Code:
(a) (A), (B), (C) and (D) (b) (A), (C) and (E)
(c) (A) and (E) (d) (B), (D) and (E)

69. In a classroom, use of communication technology presupposes: **[20th June 2019-Ist Shift]**
(a) Inattentive audience.
(b) Luxurious ambience.
(c) Extrapolation of contents.
(d) New forms of expression and applications.

70. Communication through colors can result in: **[20th June 2019-IInd Shift]**
(1) Aesthetic codes (2) Cultural codes
(3) Semantic codes (4) Binary codes
Choose the correct answer from the options given below:
(a) (1) and (4) (b) (2) and (3)
(c) (2) and (4) (d) (1) and (2)

71. In the communication process, signs derive meanings through: **[20th June 2019-IInd Shift]**
(a) The subjectivity of various components.
(b) The objectivity of the decoder.
(c) The network of inter-relations.
(d) The neutrality of the channel.

72. Language of the communication also constitutes: **[20th June 2019-IInd Shift]**
(a) The random world (b) The social world
(c) The divine world (d) The unsanctified world

73. In a classroom, delayed feedback can happen due to: **[21st June 2019-Ist Shift]**
(a) Use of technology
(b) Expanded communication
(c) Semanic noise
(d) Participatory environment

74. A basic principle of effective class room communication is that one should adapt his or her own _____ to the audience. **[21st June 2019-IInd Shift]**
(a) Accent (b) Exterior
(c) Message (d) Mannerism

75. In communication process, body language is associated with **[21st June 2019-IInd Shift]**
(a) A culture (b) A movie audience
(c) A classroom situation (d) A subject taught

76. A key element for effective classroom communication is [**21st June 2019-IInd Shift]**
(a) Passivity (b) Negativity
(c) Deflection (d) Advocacy

77. Local and face-to-face communication is reffered to as [**21st June 2019-IInd Shift]**
(a) Clinical integration
(b) Demonstrative integration
(c) Social integration
(d) Spatial integration

78. In a classroom situation, a teacher organises group discussion to help arrive at a solution of a problem. In terms of a model of communication used, it will be called: **[24th June 2019-Ist Shift]**
(a) A transactional model (b) An interaction model
(c) A horizontal model (d) A linear model

79. Peer group interaction in a classroom helps in: **[24th June 2019-IInd Shift]**
(a) Concept understanding
(b) Realization of one's misunderstanding
(c) Rapport Building
(d) Questioning

80. Which of the following signifies non-verbal communication in an essential way? **[24th June 2019-IInd Shift]**
(a) Instructions written on a question paper.
(b) Learner attending an online class.
(c) The dress code followed by an individual.
(d) Yoga instructor teaching yoga poses to the pupils.

81. The cognitive domain of communication involves matters related to **[25th June 2019-Ist Shift]**
(a) Emotions (b) Knowledge
(c) Fantasy (d) Escapism

82. In a class room, a student to be an effective listener, has to take note of **[25th June 2019-Ist Shift]**
(1) The teacher appearance
(2) The peer group
(3) The academic content
(4) Communication distractions
Choose the correct answer from the options given below:
(a) (1), (2) and (3) (b) (2), (3) and (4)
(c) (1), (4) and (3) (d) (3) and (4) only

83. Which of the following principles a good communicator should follow? **[26th June 2019-IInd Shift]**
(1) He should stay organised
(2) He should avoid the use of visuals
(3) He should be authoritarian
(4) He must adjust to the medium
(5) He should prefer the method of story-telling
Choose the correct answer from the options given below:
(a) (1), (2) and (3) (b) (2), (3) and (5)
(c) (2), (4) and (5) (d) (1), (4) and (5)

84. Non-verbal communication is mostly **[26th June 2019-IInd Shift]**
(a) mechanical (b) organic
(c) unstructured (d) structured

85. The sequential order of elements in classroom communication is: **[20th June 2019-Ist Shift]**
(a) knowledge, interest, evaluation, awareness.
(b) awareness, interest, evaluation, knowledge.
(c) evaluation, awareness, knowledge, interest.
(d) interest, knowledge, evaluation, awareness.

86. The sequential order of elements in classroom communication is: **[20th June 2019-Ist Shift]**
(a) knowledge, interest, evaluation, awareness.
(b) awareness, interest, evaluation, knowledge.

(c) evaluation, awareness, knowledge, interest.
(d) interest, knowledge, evaluation, awareness.

87. Which of the following are rhetorical techniques for structuring classroom communication? **[3rd Dec. 2019-Ist Shift]**

A. Relating the day's topic to students interests.
B. Providing scattered information to the target audience.
C. Smooth transition from one idea to another.
D. Avoiding the use of artifacts.
E. Using media to improve the quality aspect of reception of messages.
F. Opting for one-way communication.

Choose the correct option from the choices given below:
(a) (A), (B) and (C) (b) (B), (C) and (F)
(c) (A), (C) and (E) (d) (D), (E) and (F)

88. Choose the person who has control over self, mode of communication and method of delivery in classroom from the following? **[4th Dec. 2019-IInd Shift]**
(a) Student (b) Teacher
(c) Audience (d) Visitor

89. Successful educational communication is dependent upon the skills of **[6th Dec. 2019-IInd Shift]**

A. Understanding the negative characteristics of the audience
B. Verbal communication and body language
C. Estimating time for audience impact
D. Analyzing the audience needs

Choose the correct answer from the options given below:
(a) A and B only (b) B and C only
(c) C and D only (d) B and D only

90. Dynamics of good classroom communication involves: **[2nd Dec. 2019-Ist Shift]**

(A) Indifference
(B) Motivation
(C) Being organised
(D) Exclusivity
(E) Participation
(F) Gendered views

Choose the correct option from the following:
(a) (A), (B) and (C) (b) (B), (C) and (D)
(c) (B), (C) and (E) (d) (C), (E) and (F)

91. A teacher tells his students — 'When you learn this, you will be able to carry out your project'. What does this communication suggest? **[2nd Dec. 2019-Ist Shift]**
(a) Continued interest (b) Ambiguous advice
(c) Potential threat (d) Positive reinforcement

92. Micro expressions, as part of classroom communication, are **[2nd Dec. 2019-IInd Shift]**
(a) negative (b) positive
(c) manipulative (d) fleeting

93. Which of the following are essential for good classroom communication? **[2nd Dec. 2019-IInd Shift]**

(A) Over-emphasis on certain words.
(B) Use of gobbledygook
(C) Proper employment of redundancy
(D) Immediacy of feedback
(E) Non-verbal cues
(F) Sidelining student criticism

Choose the correct option from the following:
(a) (A), (B) and (C) (b) (B), (C) and (F)
(c) (C), (D) and (E) (d) (D), (E) and (F)

94. Mini-summaries at the end of each class is called **[2nd Dec. 2019-IInd Shift]**
(a) Verbal break-up (b) Clichéd conclusion
(c) Verbal signposting (d) Staggered conclusion

95. In the digital era, there is a fear that classroom communication may result in **[2nd Dec. 2019-IInd Shift]**
(a) Over-stimulation (b) Quick adaptation
(c) Stimulation (d) Passive adaptation

96. Communication in the classroom takes place in which of the following levels? **[3rd Dec. 2019-Ist Shift]**
(a) Opportunistic meaning
(b) Surfacial meaning
(c) Noise-level meaning
(d) Non-coded meaning

97. Learner communication has relatively high potential of challenging **[3rd Dec. 2019-Ist Shift]**
(a) Teaching as profession
(b) Innovative and creative ideas
(c) Methods of evaluation
(d) Long-held attitudes

98. Effective classroom communication can transform **[3rd Dec. 2019-Ist Shift]**
(a) academic administration
(b) academic marketing
(c) teaching-learning process
(d) management strategies

99. Which of the following tools is a collaboration tool for providing virtual classroom environment? **[3rd Dec. 2019-Ist Shift]**
(a) A-Lab (b) A-Tutor
(c) A-View (d) A-Learner

100. An important element in classroom communication is **[3rd Dec. 2019-IInd Shift]**
(a) Physical infrastructure
(b) Fields of experience
(c) Conditioned feedback
(d) Linearity of Message

101. Effective oral communication demands **[3rd Dec. 2019-IInd Shift]**

(A) Self-confidence
(B) Long pauses
(C) Consistent practice
(D) Business like approach
(E) Knowing the audience
(F) Aggressive questioning

Choose the correct answer from the following option :
(a) (B), (C) and (D) (b) (C), (D) and (F)
(c) (D), (E) and (F) (d) (A), (C) and (E)

102. When there is an animated discussion between a teacher and his or her students in the classroom, it can be classified as: **[4th Dec. 2019-Ist Shift]**
(a) Horizontal communication
(b) Mechanical communication
(c) Linear communication
(d) Categorical communication

103. A verbal communication technique used in teaching is **[4th Dec. 2019-Ist Shift]**
(a) Slow expression of Words
(b) Varying the speed of voice and tone
(c) Presentation without pause
(d) Resorting to semantic jugglery

104. Classroom Interactions are inuenced largely by **[6th Dec. 2019-Ist Shift]**
(a) Student's commitment
(b) Teacher centric environment
(c) Organisational oversight
(d) Unsolicited interventions

105. Classroom communication is **[6th Dec. 2019-Ist Shift]**
A. Like a computer- program B. Dictatorial
C. Purposeful D. Pragmatic
Choose the correct option from those given below
(a) (A) and (C) (b) (B) and (C)
(c) (B) and (D) (d) (C) and (D)

106. Effective educational communication is **[6th Dec. 2019-IInd Shift]**
(a) Non-reciprocal (b) Repetitive
(c) Continuous (d) Coercive

107. Which of the following theories can be applied to classroom communication? **[6th Dec. 2019-IInd Shift]**
(a) Theory of Social Constructivism
(b) Audience Marginalization Theory
(c) Ritualistic Theory
(d) Theory of Hegemony

108. Connotative communication inside the classroom is: **[20th June 2019-IInd Shift]**
(a) Direct (b) Critical
(c) Implicit (d) Explicit

109. Given below are two statements - one is labelled as Assertion (A) and the other is labelled as Reason (R): **[3rd Dec. 2019-IInd Shift]**

Assertion (A): The spoken and written words are two media of many available for communication in the classroom.

Reason (R): Communication through any medium does not happen through attitudes of encoders.

In the light of the above two statements, choose the correct option from the choices given below:
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true. and (R) is not the correct explantion of (A)
(c) (A) is true. but (R) is false
(d) (A) is false. but (R) is true

110. Given below are two Statements – one is labelled as Assertion (A) and other is labelled as Reason (R):

Assertion (A): Use of slang in formal teaching makes communication lively and interesting.

Reasons (R): Academic decency demands the avoidance of slang in the classroom environment.

In the light of the above statements, choose the correct option: **[4th Dec. 2019-Ist Shift]**
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true and (R) is not the correct explanation of (A)
(c) (A) is true, but (R) is false
(d) (A) is false, but (R) is true

111. Given below are two statements - one is labelled as Assertion (A) and the other is labelled as Reason (R): **[5th Dec. 2019-IInd Shift]**

Assertion (A): Motivational aspects of learning and communication efificacy are not inter-related.

Reason (R): Communication as a social product has its own variables in a learning environment.

In the light of the above statements choose the correct option:
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(c) (A) is true, but (R) is false
(d) (A) is false, but (R) is true

112. Give Below are two statements one is labelled as Assertion (A) and the other is labelled as Reason (R). **[6th Dec. 2019-Ist Shift]**

Assertion (A): Classrooms communication is pre-decided by social and institutional demands.

Reasons (R): Positive educative actions should guide learners to acquire knowledge of social significance.

In the light of the above two statements, choose the correct option:
(a) Both (A) and (R) are true and is the correct explanation of (A)
(b) Both (A) and (R) true and is not the correct explanation of (A)
(c) (A) is true, but is (R) false
(d) (A) is false, but is (R) true

113. Given below are two statements, one is labelled Assertion (A) and the other is labelled as Reason (R).

Assertion (A): Pedagogy and social interaction are two major result-oriented activities of a teacher. **[6th Dec. 2019-IInd Shift]**

Reason (R): Communication has a limited role in both these activities.

In the light of the above two statements, choose the correct option from those given below:
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true but (R) is NOT the correct explanation of (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

114. Assertion (A): No enculturation takes place with resistance
Reason (R): People have their own values and self–interest that alter communicated messages
Choose the correct answer from the options given below: **[25th June 2019-Ist Shift]**
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A)
(c) (A) is true but (R) is false
(d) (A) is false, but (R) is true

115. Assertion (A): The 'arts' have grown out of the fundamental desire and need to communicate
Reason (R): Language is inseparable from culture which is its very source of sustenance and fundamental to communication **[25th June 2019-IInd Shift]**
Choose the correct option:
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

116. Given below are two statements – one is labelled as Assertion (A) and the other is labelled as Reason (R) : **[3rd Dec. 2019-Ist Shift]**
Assertion (A) : Defining the objectives of the topic of discussion is not necessarily the first step in class-room communication.
Reason (R) : Clear definitions of objectives make students understand the topic well.
In the light of the above stated two statements, choose the correct option from the choices given below :
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(c) (A) is true, but (R) is false
(d) (A) is false, but (R) is true

117. Assertion (A) : For an effective classroom communication at times it is desirable to use the projection technology.
Reason (R) : Using the projection technology facilitates extensive coverage of course contents. **[3rd Dec. 2019-Ist Shift]**
(a) Both (A) and (R) are true, and (R) is the correct explanation.
(b) Both (A) and (R) are true, but (R) is not the correct explanation.
(c) (A) is true, but (R) is false.
(d) (A) is false, but (R) is true.

118. In the context of a classroom teaching 'Smiles or Frowns' when used as non-verbal cues, tend to perform which of the following basic functions? **[3rd Dec. 2019-IInd Shift]**
(a) contradicting the verbal cue function
(b) regulating the verbal cue function
(c) substitute functin
(d) suppelement function

119. The principles of effective writing useful for both students and teachers are: **[3rd Dec. 2019-IInd Shift]**
(A) Stress on hyperboles (B) Liberal use of adjectives
(C) Clarity (D) Conciseness
(E) Correctness (F) Use of complex sentences
Choose the correct option from the following:
(a) (A), (B) and (C) (b) (B), (C) and (D)
(c) (C), (D) and (C) (d) (D), (E) and (F)

HINTS & EXPLANATION

1. (c) **Articles** present an in-depth analysis of an issue or event; **Editorials** are expert opinion of the Editor of the newspaper on a topical issue or event; **Letters to the editor** present the readers feedback on the news items they have read in the newspaper. Newspapers rarely, if ever, provide a feedback on 'letters to the editor' which are the only contribution from the readers.

2. (a) Noise is the first and biggest barrier to effective communication. Hence, the priority should be to select such a means of communication as would eliminate or minimise the occurrence of noise.

3. (a) Communication occurs at different levels simultaneously, each with its nuances and complexities. These levels of communication are (a) verbal, (b) physical, (c) auditory, (d) emotional or psychological, (e) energetic or psychic.
Semantic noise occurs at A level when meaning of a message gets distorted due to ambiguity in words, symbols, etc.
Psychological noise occurs at D level and results from preconceived notions communicators bring to conversations.
Source noise occurs at B level due to speech issues (mumbling, lisping, stammering, etc) of the sender (source).
Channel noise occurs at C level from poor sound quality of channel (cable, network, broadcast media, etc.)

4. (b) Communications bandwidth that has the highest capacity and is used by microwave, cable and fibre optics lines is known as broadband.

5. (a) Verbal communication
There are three basic types of communication: verbal, non-verbal, and written. Verbal or oral communication

comprises spoken words to communicate a message; non-verbal includes gestures, mannerisms, body language; and written constitutes that which is scripted and recorded for later reference.

6. (d) Intrapersonal communication, or communication within the individual, is an area of study that is fundamental to the study of all communication. Communication can be thought of as beginning with the self.

7. (a) Data within a computer system is transmitted via parallel mode, a method of conveying multiple binary digits (bits) simultaneously, e.g., between a computer and a printer (parallel printer port and cable).
Data between computer systems is usually transmitted in bit serial mode. It is, thus, necessary to make a parallel-to-serial conversion at a computer interface when sending data from a computer system into a network (Internet) and a serial-to-parallel conversion, when receiving information from a network (Internet). Internet chatting involves the same process. It is not face-to-face, so non-verbal exchange is impossible. Grapevine is usually informal and oral and includes generous non-verbal components.

8. (a) Signs, symbols, codes, colours

9. (c) Codes are systems of signs, which create meaning. Codes can be divided into two categories - technical and symbolic. Technical codes are all the ways in which equipment is used to tell the story in a media text, for example the camera works in a film. Symbolic codes show what is beneath the surface of what we see, for example language in communication.

10. (d) **Connotation** refers to the set of positive and negative associations that most words naturally carry with them, while **denotation** is the precise, literal, explicit definition of a word as listed in a dictionary. For instance, 'use' literally means, 'operate to achieve something'. Words such as 'utilise' and 'employ' give its positive connotation while 'exploit' gives its negative connotation.
Words gain positive or negative connotations depending upon the social, cultural, and personal experiences of individuals.

11. (c) The environment or context in which communication takes place has an impact on the communication behaviour. It refers to the immediate physical and social setting in which communication happens. It includes the culture/society of the communicator's birth, education, experiences and relations.

12. (c) Encoding means the creation of a message for communication; and, decoding means receiving and understanding/interpreting the meaning of the message. Channelization refers to making this information flow; the channel of flow can be face to face, phone call, memo, email, etc.
Mediation refers to intervention by a third party to rectify disruption of communication.

13. (c) Argument and controversy are counterproductive to learning. Generating Information does not guarantee retention of information gathered. Ideas fuel the mind of learners and further the learning process.

14. (b) The process of teaching and learning is aimed at the attainment of instructional outcomes for the student. The teacher is only a facilitator and the textbook is just an aid. Therefore , classroom communication must be student-centric.

15. (b) Edutainment, a portmanteau of the words "education" and "entertainment," refers to technologies and software products that combine education with entertainment in some way. In the digital age, many of these products and technologies seek to make education more attractive to young people and students.

16. (a) Transpersonal communication is interaction that occurs within a person's spiritual domain. Study of the influence of religion and spirituality has increased dramatically in recent years.

17. (b) Empathy is the ability to understand and share the feelings of another.
Sympathy is feeling pity and sorrow for someone else's misfortune.
Apathy is lack of interest, enthusiasm, or concern.
Antipathy means a deep-seated feeling of aversion.
So, a teacher needs to have empathy in order to connect to the students which is important for students to be interested in listening to the teacher and attain instructional outcomes.

18. (b) Entertainment is the action of providing or deriving amusement or enjoyment by holding the attention and interest of an audience. Entertainment is the concern of the domain of cinema, television, radio, theatre, and music.
The term 'Edutainment' is used in teaching and education to convey that the teacher's communication in the classroom should provide education as well as entertainment. It includes games, television programmes, or other material, intended to be both educational and enjoyable.
The term 'Infotainment' usually appears in the media for a combination of information and entertaining content designed to appeal to consumers.
'Enlightenment' means 'full comprehension of a situation" and is used in the context of religion and spiritual awakening.
So, Edutainment is the principle on which classroom communication rests.

19. (b) Reciprocal teaching involves group interaction between teacher and students in an instructional activity pertaining to the topic to be learnt.
In circular communication, information travels in a cyclic fashion around the main point, each person acting as both sender and receiver and using interpretation. So, learning process is likely to lose direction and go haywire.
Directional communication follows an aimed direction and hence restricts free progression of learning outcomes.

Influential communication is teacher oriented and restricts the learners' free thinking.

20. (c) Classroom communication has three components: verbal, nonverbal and written. Verbal communication comprises words spoken by the teacher and students. Nonverbal communication refers to their body language and gestures. Written communication comprises writing directed at the teaching-learning process including teacher's board work, report card comments and student assignments. Teachers and students interact with one another in various contexts, and use all of these three types of communication. Classroom communication is normally considered as cognitive.

21. (d) The communicated knowledge in a classroom pervades in the class and progresses to spread out into the society. It is not non-pervasive.

Knowledge and skills are learnt in a dynamic process rather than being limited in conclusion or judgement. Kant's theory of autonomous virtue highlights the capacity of rational agents to deliberate and govern themselves by the moral law, rather than merely heeding others. It is not pertinent to knowledge communicated in classroom which is generally based on listening to the other (teacher).

Cultural capital is the repository of knowledge, behaviours, and skills that demonstrate one's cultural competence, and mark one's status in society.

22. (a) A local area network (LAN) is a group of computers and associated devices that share a common communications line or wireless link and typically share the resources of a single processor or server within a small geographic area (for example, within an office building).

23. (c) Group communication is a mode of communication in an organization, between employers and employees, and em¬ployees in teams/groups. Group communication can further be looked from an marketing perspective as communicating to a group of people or target customers in order to market a product.

24. (c) In communication, myths have power, but are imprecise.

25. (d) The term classroom discourse refers to the language that teachers and students use to communicate with each other in the classroom. Talking, or conversation, is the medium through which most teaching takes place, so the study of classroom discourse is the study of the process of face-to-face classroom teaching.

26. (b) 'Cognitive Communication' involves abilities and processes such as orientation, attention, memory, problem solving, and execution that allow humans to interact meaningfully.

'Effective Communication' involves sending a message that is easily understood by the receiving party.

'Affective Communication' involves the expression of feelings about things, people, places, etc.

Selective communication involves individuals' tendency to absorb information which reinforces their pre-existing views and reject contradictory information.

27. (d) The Telephone Model of Communication was first developed in the area of Information theory.

28. (d) Generally, entropy refers to disorder or uncertainty, and the definition of entropyused in information theory is directly analogous to the definition used in statistical thermodynamics. The concept of information entropy was introduced by Claude Shannon in his 1948 paper "A Mathematical Theory of Communication".

29. (b) Humans communicate through the process of encoding and decoding. Encoding is the process of turning thoughts into communicating message through the 'medium' of a phone call, email, text message, face-to-face meeting, or other communication tool. The audience then 'decodes', or interprets, the message for themselves. Decoding is the process of turning communication into thoughts.

A propagator is a person who spreads and promotes an idea, theory, etc.

An agitator is a person who urges others to protest or rebel.

30. (a) Verbal means 'relating to or in the form of words'. Therefore, a verbal code is a set of rules about the use of words in the creation of messages. Words can be either spoken or written. Verbal codes, therefore, include both oral and written language.

Communication is two-way, so, it cannot be intrapersonal (communicator's internal use of language or thought). It is between persons, i.e., interpersonal.

Communication has two components: verbal language and non-verbal paralanguage.

Language uses the letters or symbols of the alphabet to make words but it creates meaningful sentences rather than symbolic code.

31. (b) (A), (B) and (C)

Survey results indicate that the most important factor in students' attitude to attending classes is the lectures' quality and clarity, followed by the teacher's use of relevant examples, and the teacher's ability to engage and entertain the students. Good communication of the teacher effects higher attendance, and greater comprehension which translates into better performance. Therefore, effectiveness of communication can be traced from Attitude surveys, Performance records and Students' attendance.

32. (c) In one-way communication, information is transferred from the sender to the receiver without any opportunity for the receiver to give feedback to the sender. One-way communication is most often used to give factual information or to persuade or manipulate the receiver to act a certain way. It is not considered an effective principle of communication. Effective communication is always two-way, where feedback is an indispensable feature, which

means audience participation exists. Persuasive and convincing dialogue makes communication effective. Strategic use of grapevine or informal communication at the workplace also gets good results.

33. (d) Eye contact is a form of body language which is important during communication. When you keep eye contact with the person you are talking to, it indicates that you are focused on the communication; are paying attention to what the person has to say; and, you are speaking the truth, or you mean what you say. So, eye contact instils trust.
Use of hyperbole or exaggeration as well as abstract concepts puts off the audience; voice modulation creates impact but does not help in building trust.

34. (c) Teacher student communication is done with the purpose of teaching and learning. Hence, it is utilitarian. It is not critical (disapproving), spurious (fake) or confrontational (hostile) for each of these attitudes are contradictory to the purpose.

35. (d) Context comprises the circumstances related to a message. The circumstances might include the setting, the era, the value positions of the communicators, appropriateness of a message, the forum under which communication takes place, and accepted norms, etc. Not every type of communication is affected by their Reception, Transmission or Non-regulation.

36. (b) Non-verbal communication has been defined as communication without words. It includes apparent behaviours such as facial expressions, eyes, touching, tone of voice, as well as less obvious messages such as dress, posture, attitude, and spatial distance between two or more people. Nonverbal communication in the classroom occurs with distance, physical environment, facial expression, vocal cues, body movements and gestures, touch, time, and physical appearance.

37. (c) Paralanguage is the study of non-verbal cues of the voice. Various acoustic properties of speech such as tone, pitch and accent, collectively known as prosody, can all give off nonverbal cues. Paralanguage may change the meaning of words. An example of paralanguage is the pitch of your voice.

38. (d) The following are diagrammatic representations of the given communication patterns.

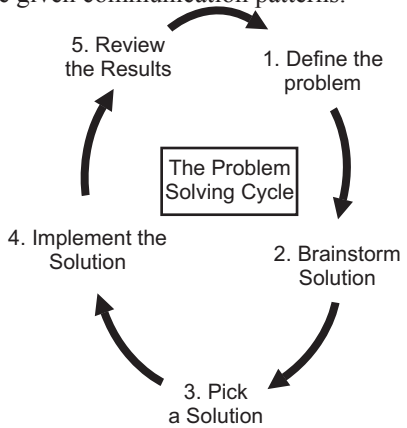

Fig. 1. Problem orientat

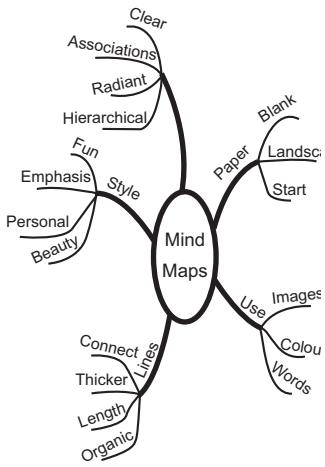

Fig. 2. Mind-Mapping

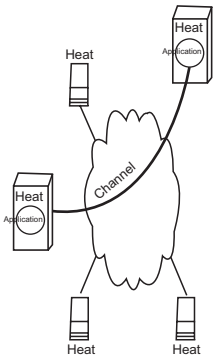

Fig. 3. Idea Protocol

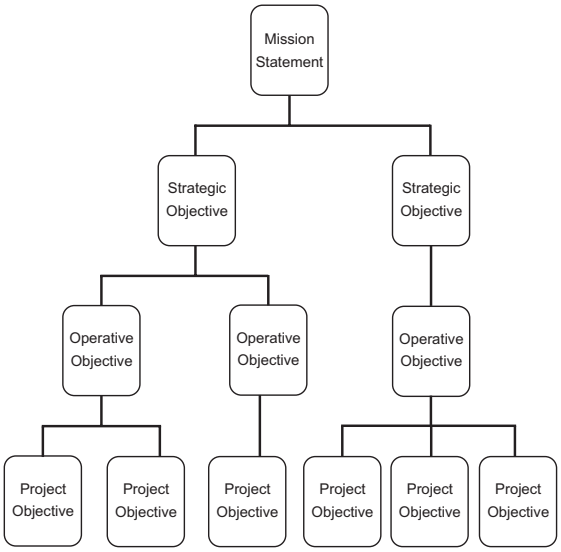

Fig. 4. Systemisation

39. (b) Human voice is a workable tool. Just like with music, the pitch, rhythm and tone of our voice can be worked to convey a meaning additional to, or maybe different from, the literal interpretation of the words spoken. So, it is an important element for a teacher to use while addressing students in the classroom.
Proximity enhances communication, so, it should not be avoided.
Repetitive pause as well as fixed posture has adverse effect on communication.

40. (a) Horizontal communication is the transmission of information between people, divisions, departments or units within the same level of organizational hierarchy. It is distinguished from vertical communication, which is the transmission of information between different levels of the organizational hierarchy. Vertical communication can be Downward, Upward or Cross.
Corporate communication is a management function or department, like marketing, finance, or operations, dedicated to the dissemination of information to key

constituencies, the execution of corporate strategy and the development of messages for a variety of purposes for inside and outside the organisation.

41. (b) For effective communication to follow, every communicator has to feel positively excited in anticipation of desired responses.

42. (c) Where and how the teacher positions themselves sends a message to students about what is expected of them and how available the teacher is. There is a need for a balance in terms of the attention students receive, according to the requirements of the activity.

43. (d) Acknowledgement of thoughts, reflection, and asking open-ended questions
All the other mentioned items of behaviour are barriers to effective communication.

44. (d) Facial expression and kinesics (body language and gestures) of the coder as well as encoder is important in the smooth progression of the communication process. The personal space one enjoys in the classroom environment, the limitations of the seating arrangement notwithstanding, is an important determinant of the way communication is likely to progress.
Cultural space is not relevant in ideal classroom communication. Physical ambience and acoustics (including high sound) are part of the classroom environment.

45. (c) Pauses separate thoughts. They are powerful and important in effective communication. Periodical pausing allows the audience time to catch up with and absorb the meaning of what has been said. It also builds anticipation and wonder for what is to follow. Pausing after asking a question is a good technique to mentally involve the audience and make them think. An artfully cultivated 'spontaneous pause' helps the speaker to change direction smoothly. However, one must be careful not to pause too long to sow doubts in the audience. So, as a good classroom communicator, one needs to know one's artful pauses well.

46. (d) Power, structure and tradition Classroom situation has little room for controversy, criticism or non-acceptance. So, options A, B and C are ruled out. Classroom communication is generally built around the tradition of teaching established in human society since ancient times. The teacher's words wield power and are transacted in a structured manner.

47. (a) The teacher at a given point of time has immediate control only over how he/she chooses to conduct the self and the class(which includes the 'what' and how' of teaching/communicating). The behaviour of the audience, their reception, experience, feedback; or, the noise generated by them or other factors can be modulated/controlled only after its appearance. The technology, the communication channel, other communicators, and external factors are not under the teacher's control.

48. (d) **Feedback** is the response of a receiver to sender's message; **fragmentation** is the transition of a target large audience population for any one media product to more numerous smaller audiences resulting from a substantial increase in the number of options from which people can choose; and, **channelization** refers to the sharing of a point-to-point communications medium.

49. (d) When classroom communication is positive, students are influenced and persuaded to learn willingly and need not be coerced into the desired action. Positive communication instils confidence in them to shed their inhibitions and speak their mind. This scenario makes learners interactive rather than submissive and there's hardly any confrontation as each one enjoys freedom of expression.

50. (b) Expressive communication refers to encoding of a message to the decoder to make something happen or to stop something in progress. Expressive language includes making requests, giving information or command, and so on; hence, it cannot be passive. Individuals with language disorders and those who lack expressive language skills suffer frustration of not being able to get across and it reflects in behaviour which may be one of passive aggression. This phenomenon is observed in toddlers, too. They get irritable and throw tantrums when they are unable to express what they want, or how they feel.
What one expresses flows from one's mind; so, external clues do not drive it.
Expressive communication does not depend on the equation between the encoder and the decoder.

51. (c) Something factual is real. It is based in fact, meaning it can be proven, repeated or observed. In fact, fact is the root of the word factual, from the Latin word factum, meaning "event, occurrence." The factual part of a story is the part that really happened the rests gets more outlandish and make-up every time someone tells it. Evidence makes something factual.

52. (a) The central hypothesis of social identity theory is that group members of an in-group will seek to find negative aspects of an out-group, thus enhancing their self-image. Classroom communication infuses the social identity of belonging to a class and discriminating against those belonging to another. External inanities and biased passivity in individuals result from a variety of factors. Groups can be formed on any of a wide variety of bases like classmates, playmates, neighbours, colleagues, and so on. So, group aggression is not always based on classroom communication.

53. (c) Communication is effective when Verbal and Non-verbal messages are complementary rather than contradictory to each other. As non-verbal communication is instinctive, people connect it with the communicator's reality and hence tend to find it more believable, in consonance with the saying, 'Actions speak louder than words.'

54. (d) Effective communication presupposes or requires as a pre-condition, an understanding between communicator and receiver. The state of being non-aligned or 'not sharing a current reality' is not a pre condition because alignment can either hinder or promote communication depending on the goals. Passivity as well as domination hampers communication.

55. (d) An icebreaker is an activity, game, or event that is used to welcome and warm up the conversation among participants in a meeting, training class, team building session, or another event. Any event that requires people to comfortably interact with each other can be a potential an icebreaker. As interactive and often fun sessions run before the main proceedings, ice breakers help people get to know each other and buy into the purpose of the event.

Non sequitur is a conclusion or statement that does not logically follow from the previous argument or statement. It is not the mark of a good communication. This as well as repetitive phrase and complex question makes the audience squirm. All of these three hamper communication.

56. (b) 'Empathetic' refers to the ability to understand and share the feelings of another. Empathetic communication involves the awareness of what one does and how and its impact on others; so as to create better connections, and feel motivated and willing to respond in any situation.

'Contrived' refers to false and deliberate, rather than natural. Such communication fails to create the connect desirable for effective learning.

'Abstract' refers to something not specific, nor concrete. Abstract communication is prone to straying away from the topic, thus, hindering learning.

Non-descriptive communication is likely to compromise the understanding of the learners.

57. (a) In cognitive psychology, cognitive load refers to the effort being used in the working memory. Cognitive load theory was developed out of the study of problem solving by John Sweller in the late 1980s. Cognitive load is typically increased when unnecessary demands are imposed on a learner, making the task of processing information overly complex. Such demands include the unnecessary distractions of a classroom and inadequate methods used by teachers to educate students about a subject. When cognitive load is managed well, students are able to learn new skills easier than when high cognitive load interferes with the creation of new memories.

58. (c) The interaction between a teacher and students creates a zone of proximal development. The zone of proximal development (ZPD) is the difference between what a learner can do without help and what he or she can do with help. It is a concept developed by Soviet psychologist and social constructivist Lev Vygotsky (1896 - 1934). The zone of proximal development (ZPD) of a child is not a naturally existing phenomenon that arises by itself every time an adult helps a child achieve greater independence. It is a special form of interaction in which the action of the adult is aimed at generating and supporting the child's initiative. Vygotsky among other educational professionals believes the role of education to be to provide children with experiences which are in their ZPD, thereby encouraging and advancing their individual learning.

59. (c) (a), (b), (c) and (d)

Communication has the following characteristics:

1. It is a two way process involving at least two persons.
2. It is a continuous or dynamic process. Barriers can be overcome to resume the communication. [see (d)]
3. Its basic purpose is to stimulate the understanding and response of the receiver.
4. Communication may be verbal or written; formal or informal; and may assume the form of an order, instruction, report, query, etc. [see (a)]
5. It pervades all human relationship, formal or informal.
6. Communication is verbal as well as non-verbal.
7. It is a goal oriented process, aimed at achievement of objectives, and is effective only when the goals of both the parties are in harmony.
8. It is an interdisciplinary science, deriving from anthropology (study of body language), sociology (study of human behaviour), psychology (study of attitude), etc.
9. It can straighten the bumps but does not guarantee success. [see (c)]
10. Communication skills can be learnt and improved to achieve desired results. [see (b)]

60. (c) The fact, whether certain stimuli are acceptable or not, determines whether the recipient will pay attention to them or ignore.

Selection of expectation of performance; peer groups; and morality are concerns that are not based on the acceptability of the stimuli.

61. (c) (A) is true, but (R) is false.

Classroom communication is based on the process of transacting the lesson and receiving its feedback from the learners. Student's feedback is expected to be on the lines of the planned objectives and hence, the teacher does assume that they are purposive.

62. (d) (A) is false, but (R) is true.

Communicating well in the classroom is an art that can be cultivated and mastered. Knowledge of communication process is essential to effectively transact the lesson according to the customised plans, and achieve the desired objectives.

63. (d) (A) is false, but (R) is true.

The teacher's initial messages to the students must be critical to establish later interactions; for, it forms the basis of all transactions. Control over communication process translates into streamlining the learning of students.

64. (b) Both (A) and (R) are true.

(R) is the correct reason behind the assertion (A). If classroom interaction is ideal and effective, it is not difficult to predict the outcomes.

65. (a) 2/3

Dr. Albert Mehrabian, author of Silent Messages, conducted several studies on nonverbal communication and found that 7% of any message is conveyed through words, 38% through certain vocal elements, and 55% through nonverbal elements (facial expressions, gestures, posture, etc). A University of Pennsylvania study reported that the majority of communication is transmitted non-verbally; 70% is body language, 23% is voice tone and inflection, and only 7% comprises spoken words.

66. (b) Graphics

Iconic communication uses icons or symbols to represent words or linguistic concepts. The reference of words is

arbitrary, so, learning their meaning becomes necessary. Icons are easier to remember because it is often part of a consistent system of representation which provides a context. It is a well-known aid to memory to associate the thing to be remembered with a simple object to which it has a defined relationship; e.g., the following road sign suggests a narrow path ahead.

Graphics are images or visual representation of objects. Email or telephone does not use icons. Scripting is very rarely iconic (hieroglyphs, etc.)

67. (a) (A), (C), (D)
If classroom communication is interactive, i.e., students' feedback is included therein, it happens in a circular manner, rather than linear, with the teacher as the focal point. It is organised and complete with little left to be desired

68. (a) (A), (B), (C) and (D)
In classroom communication, the teacher sometimes has to exercise coercive power to bring straying or errant students on track, reward power to encourage achievement, and referent power (ability to influence by virtue of reverence commanded by an organisational leader) to obtain desired behaviour. The power of the teacher, by virtue of the authority instituted in the position, is legitimate when used for the objective of teaching rather than to extract personal advantage.

69. (d) Use of communication technology in classroom presupposes or requires as precondition new forms of expression and applications. In order to adopt the latest technologies, the school education system needs revamping in various aspects that includes curriculum design; delivery mechanism; teacher concerns; student motivation; and appropriate and adequate technology infrastructure right in the classroom. In the digital era, the conventional role of teachers is in transition from knowledge givers to facilitators, constructors and creators of learning environments. This calls for equipping teachers with new skills and capabilities to use technology effectively.

70. (d) Colour codes/symbols/meanings stem from psychological effects, biological conditioning and cultural developments. Some colour associations are ingrained in us because they're visible all around us, like red of fire and warmth or green of nature and serenity. We're biologically wired to be shocked/alarmed by bright colours because bright coloured animals/ plants are often dangerous/poisonous; and to be drawn to red or yellow fruit as the colours indicate ripeness and sweetness.
Colours carry deep meanings with them in every culture. Various nations/tribes have stark differences in the symbolism of colours within their cultures. For instance, in some cultures, white represents innocence, but in others, it may symbolise death. The symbolism of colours often stems from religious, spiritual, social, or historical events in a particular culture.
Aesthetics or beauty and art thrives on colour communication as follows:
Seasons (Spring = Red; Summer= Yellow; Autumn= Black; Winter= White)
white - days of celebration, consecrations, coronations and important events; red - meaning blood, would be used for the Passion of Christ and martyrdoms of the Apostles and other Saints; green - moments defined before Lent and after the Holy Trinity; gold brocade - replaced white, red or green; black - meant mourning, being black for funerals and mass of the deceased violet- penance ; and so on ...

71. (c) Signs in communication work on the ideas and images; thoughts and feelings; constructs and intentions they bring to the mind. So they derive meanings through the network of inter-relations. Some signs are natural while others have to get their signification as linguistic entities and cultural symbols.

72. (b) Language of communication inheres in society. It is the window to the mind and heart of the other and the principal vehicle for the transmission of culture in the society, playing a role in both stimulus and response of the communicators....

73. (c) Semantic noise in communication is interference with the interpretation of the message due to ambiguity in words, sentences or symbols used in the transmission of the message.

74. (c) Communication is effective only when the message is completely understood by the receiver. For complete understanding, barriers to communication must be removed or minimised. Semantic noise or hindrance to understanding caused by pedantic vocabulary or regional colloquialisms, illegible verbal cues, etc., is one such barrier which can be minimised by the teacher adapting the message to the learners' cognitive, affective and psychomotor skill/aptitude for learning.

75. (a) Body language makes up the largest part of our non-verbal communication. It includes physical behaviours such as facial expressions, body posture, gestures, eye movement, head movement, silence, touch and the use of space, all of which convey obvious or subtle messages. However, the meaning of a particular physical behaviour varies in different cultural contexts

76. (d) By advocacy is meant 'support, encouragement and recommendation' for the client—who, in case of classroom communication, is the teacher's student. The teacher's advocacy is a key element in classroom communication as it motivates students to learn and excel. On the other hand, the teacher's passivity demotivates learners; negativity impairs academic achievement and harms their psychological as well as physical health; and deflection from the topic underway compromises the learning outcomes. All of these hamper communication.

77. (c) Social integration is the process of incorporation of new members in the social structure of the host society. People in the society normally engage in formal and informal communication or exchange of ideas and opinions as they see/face each other physically. This face to face communication gradually brings them closer.

Thus, with face to face communication new members get increasingly closer to the original members and finally get integrated in the society.

78. (a) The transaction model of communication describes communication as a process in which communicators consiously generate social realities within social, relational, and cultural contexts. They don't just communicate to exchange messages; but to create relationships, form intercultural alliances, shape their self-concepts, and solve problems.

The interactive model is less message-focused and more interaction-focused. Each participant alterates rates as sender and receiver very quickly and often without conscious thought in order to keep communication going.

79. (a) Peer teachers feel more comfortable and open when interacting with a peer as they share a similar discourse, allowing for greater understanding. They reinforce their own learning by instructing others.

80. (c) 'Non-verbal' pertains to the absence of words. Among the options, only 'the dress code followed by an individual' does not involve use of words .

81. (b) The three domains of learning are– Cognitive, Affective, Psychomotor; so, communication for teaching/learning also involves these.

1. Cognitive is the thinking domain involving knowledge.
2. Affective is the feeling domain.
3. Psychomotor is the kinaesthetic or bodily movement domain.

82. (d) Important factors/clues for effective listening:

1. Face the speaker and maintain eye contact
2. Be attentive, but relaxed
3. Keep an open mind
4. Listen to the words and try to picture what the speaker is saying
5. Don't interrupt and don't impose your opinion/solution
6. Wait for the speaker to pause to ask clarifying questions
7. Ask questions only to ensure understanding
8. Try to feel what the speaker is feeling
9. Give the speaker regular feedback
10. Pay attention to what isn't said—to nonverbal cues.

In classroom communication, the appearance of the speaker (teacher) does not suggest any significant non verbal clue.

Linear communication takes place between the teacher and the student; the peer group is outside this process/ channel unless the teaching is done through group communication.

So, a student needs to pay attention to the academic content being delivered by the teacher; and, needs to eliminate/overcome communication distractions/ barriers for effective listening.

83. (d) A good communicator should stay organized so as to eliminate distractions and obstructions; should adjust to the medium so that no message is lost; and, should prefer the method of story-telling which builds the most powerful connect and optimal reception of the message communicated follows.

Use of visuals aids communication; so, it should not be avoided. An authoritarian holds preconceived ideas and hence obstructs the normal flow of communication.

84. (c) Structured communication is according to a plan or pattern. Non-verbal communication has no structure, plan or design. It is not mechanical; rather, spontaneous and unintentional. It is different from organic communication (which also is spontaneous and unintentional) because organic 'just happens' whereas non-verbal communication originates from the sub conscious and is, therefore, continuous and convincing.

85. (b) Classroom communication starts with testing and generation of awareness on the planned topic; it proceeds to interest generation with the aid of appealing resources and aids; the learning is evaluated next; and the final result is gaining of new knowledge.

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87. (c) Rhetoric is the art of effective or persuasive speaking or writing. So, rhetorical techniques would be relating the day's topic to students; smooth transition from one idea to another; and, using media to improve the quality aspect of reception of messages.

88. (b) Classroom teaching is a planned procedure carried out by the teacher who is ideally in complete control of its direction and progress. It means that the teacher also has control over the self (conduct, approach, attitude, etc.), the mode of communication and method of delivery of the lesson to be transacted.

89. (d) Verbal and non-verbal (including body language) communication skills (option b) are the most effective determinant of the success of educational communication; and good communication skills make the desired impact irrespective of other factors that are at play. So, estimating time for audience impact (option c) is unnecessary. Understanding negative characteristics of the audience (option a) is part of analyzing audience needs (option d).

90. (c) Good classroom communication is inclusive and emotionally satisfying to all stakeholders.

While the dynamics of indifference, exclusivity and gender bias defeats this objective; that of motivation, participation and staying organised ensures effective communication which does not stray from the topic and achieves the desired outcome.

91. (b) This advice lacks clarity. It does not contain any clear specification on what is to be learnt or what the project is all about; and how 'this' can help in the project. So, it is ambiguous.

92. (d) Micro expressions are facial expressions that occur fleetingly and are over within a fraction of a second. They reveal a person's true emotions.

93. (c) Redundancy refers to messages which convey highly predictable information to the receiver. Proper employment of redundancy instils feel good factor in the

receiver/audience and makes communication effective. Quick/immediate feedback propels the communication process forward. Non-verbal cues, if used appropriately, increase clarity, trust and interest in the verbal presentation. On the other hand, over-emphasis on certain words, excessive use of technical terms (gobbledygook) and ignoring/sidelining/overlooking student criticism are barriers to good communication.

94. (c) Just as sign posts on the road orient you or show you your relative position; verbal signposts orient the audience/ students as regards the stage reached in the presentation. Verbal signposts can be of many kinds. Mini summaries at the end of a class form one of those kinds.

95. (a) Overstimulation refers to being swamped by more experiences, sensations, noise and activity than one handle without getting unsettled.

96. (b) Classroom communication is centred around a planned unit of instruction in a stipulated period of time which does not leave any scope for opportunism whether for the teacher or the taught. So, opportunistic meaning is not possible. Classroom communication involves lecturing or interactive teaching-learning ideally in a noise-free environment. So, it does not involve noise-level meaning. Students decode or understand the lesson, though in varying degrees; so, it is not non-coded meaning, either. However, since the lesson is time-bound, there is little scope for reflective thinking; hence, the level of meaning is surfacial only.

97. (d) Learner communication is intrapersonal (with the self) and interpersonal (with the teacher as well as fellow students); and it is aimed at enhancing one's knowledge and skills. Therefore, the learner supports rather than challenge innovative and creative ideas. The learner may question the teacher on subject matter and related aspects but will not challenge teaching profession, or methods of evaluation. However, the quality of the learner's questions may potentially challenge tradition and long-held attitudes which need to be changed to match growing aspirations and requirements of changing times.

98. (c) Classroom communication is the very basis on which the outcome of a planned lesson depends. How a teacher introduces and presents the lesson, gives cues for desired action and reinforces behaviour has a direct bearing on the success of the process. Thus, it has the potential to transform teaching-learning process. Academic administration, marketing and management are domains operated outside the classroom.

99. (b)

100. (b) Fields of experience, including the teacher's teaching and other experiences; and also the life experiences shared by the students, introduce valuable inputs of knowledge and skills in to classroom communication.

Physical infrastructure of the classroom has negligible effect if classroom communication is otherwise effective; conditioned feedback does not indicate learning outcomes have been attained or not; linearity of message eliminates feedback which is an important indicator of the learning that has happened.

101. (d) Effective oral communication requires self-confidence, consistent practice, knowing the audience.

Long pauses cause boredom and impatience to creep in; aggressive questioning or business-like approach distances the audience; so an informal approach directed at building a connect with the audience is what helps oral communication.

102. (a) Horizontal communication is the communication that flows laterally between persons at the same level. Though the teacher usually is higher than the taught in rank, during an animated discussion between the two, the latter rises to an equal level and this difference gets blurred.

Mechanical communication involves machine-to-machine (M2M) networks; Linear communication is one-sided, e.g., from the teacher to the taught; and, Categorical communication allows the receiver to distinguish between sounds, no matter how varied or similar they may be.

103. (b) Voice modulation (or varying the speed, pitch and tone) in teaching is a technique that keeps the learners' interest fastened on the teacher and make teaching effective.

On the other hand, slow expression of words might make fast learners impatient, presentation without pause may steal the valuable moments of reflection from the students, and resorting to semantic jugglery (play with words) may undermine comprehension.

104. (a) Classroom interactions are influenced largely by the student's commitment. Once the teacher creates the learning environment, it is the learners' prerogative to make the most of it and optimise learning.

Teacher centric environment does not allow the learner to communicate or interact freely.

Organisational oversight introduces communication barriers and affects classroom interactions.

Unsolicited interventions break the communication flow and send the classroom interactions off-track.

105. (d) Classroom communication is thoughtful and pragmatic. It is neither rigid like a computer program nor dictatorial where learners have no freedom. Ideal class communication is rather flexible and democratic. The teacher thinks and plans the communication taking all relevant factors into consideration, and carries it out sensibly and realistically on practical rather than theoretical considerations.

106. (c) Effective educational communication is continuous. Break in continuity disengages/distracts the learner and challenges the teacher to regain their attention and rescue/salvage the lesson/teaching process from reversing or tanking altogether.

Effective educational communication is reciprocal because regular feedback from the learner is essential for the teacher to proceed.

Effective educational communication is not repetitive. Repetition tends to put off the learner and undermine the teacher's stature.

Coercive communication is counterproductive as it unsettles the learner and disturbs their mental and emotional balance which adversely affects the learning.

107. (a) Theory of social constructivism is the idea that human development is socially situated and knowledge is constructed through interaction with others. Hence, this theory applies to classroom communication, too.
Audience marginalisation theory conveys the discriminatory paucity of information and communication reaching a person, group, or concept considered as insignificant or peripheral.
Ritualistic theory asserts that focused interaction or ritual, is at the heart of all social dynamics; as rituals generate group emotions that are linked to symbols, forming the basis for beliefs, thinking, morality, and culture.
Theory of hegemony is the idea that the ruling class can manipulate the value system and mores of a society, so that their view becomes the general view.

108. (c) Denotation is the basic ingredient of a term, a visual or a sign on which there is general agreement, e.g., everyone can see the facial features in a portrait.
The second layer contains the picture's implication, hint or connotation(s). Connotations are always multiple. A smiling face may connote friendliness, confidence and joy. A straight face may connote disinterestedness, disagreement or lack of happiness.

109. (c) Many media are available for classroom communication. These are spoken words, written words, non-verbal, maps, charts, ICT based audio-visual technology, etc. So, assertion (A) is true.
If communication through any medium fails to take place, the reason can be any of the following barriers on the part of the decoder, rather than the attitude of the encoder:
Physical Barriers.
Perceptual Barriers.
Emotional Barriers. ...
Cultural Barriers. ...
Language Barriers. ...
Gender Barriers. ...
Interpersonal Barriers. ...
So, Reason (R) is false.

110. (d) Academics is a formal process of learning which requires a certain level of decency and decorum for desired outcomes to follow. Slang is use of informal words and phrases which would certainly undermine the cultivated atmosphere of the classroom. So , Assertion (A) is false and Reason (R) is true.

111. (d) If communication is effective it has a high potential of increasing motivation for learning. So, Assertion (A) is false. Communication is inevitable in a social environment. However, in case of a typical learning environment, communication has its own variables –verbal (spoken, written), nonverbal, interpersonal, group, formal, informal, etc. So, Reason (R) is true.

112. (a) The assertion, 'Classroom communication is pre-decided by social and institutional demands', is true. Classroom transaction at any class level is planned in accordance with the curriculum framework which lays down the guidelines for educational institutions about what to teach and how, in accordance with the Education Policy of the nation. The education policy is: aims at educating its learner-citizens in keeping with the social demands of the nation. Institutions vary in the quality and level of resources they make available for the teaching-learning process; so, institutional demands also influence and pre-decide classroom communication.
The reason for this is that educative actions must be positively oriented and must also aim at positive outcomes so that learners acquire knowledge that is significant to fulfil social demands. Hence, (R) is the correct reason for (A).

113. (c) Pedagogy and social interaction are indeed two major result oriented activities of a teacher. Pedagogy, or the method and practice of teaching, gets results. If the teacher takes into account the various factors involved such as the availability of resources, learner's characteristics, individual differences, etc.; and plans the instruction accordingly with the most suitable methods, aids and resources possible to ensure equality of opportunity to every learner, teaching is effective. Teaching is also effective when the teacher interacts and communicates well not only with the learners but also the other members of the teaching staff, school management/administration and parents. Hence, (A) is true.
Communication is the vehicle that carries pedagogy and social interaction forward. So, it plays not a limited role, but a big role in both these activities. Hence, (R) is false.

114. (d) Enculturation is the process through which the individual acquires the culture of his group/class/segment/society.

115. (b) Here (A) and (R) both are true but (R) is not correct explanation of (A). Arts have gone out of the fundamental desire and need to communicate.
And Language is inseperable from culture which is its very source of sustenance and fundamental to communication.

116. (d) Defining the objectives of the lesson is the first step in teaching, which is a planned process guided by the objectives. So, Assertion (A) is false. However, clear definition of objectives is essential to ensure that the process progresses in the right direction, so that the students understand the topic as planned. So, reason(R) is true.

117. (b) Both (A) and (R) are true, but (R) is not the correct explanation.

118. (c) Smiles are affirmative while frowns are negative. They can substitute 'Yes' and "No' respectively.

119. (c) Writing is a means of verbal communication. The verbal (consisting of words) messages, therefore, must be clear, concise and correct to be effective; i.e., to be able to be decoded or understood as intended. So, the principles of effective writing are Clarity, Conciseness and Correctness. Stress on hyperboles, liberal use of adjectives and use of complex sentences, on the other hand, only confound the message.

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CHAPTER 16

Barriers to Effective Communication

BARRIERS TO EFFECTIVE COMMUNICATION

There are several factors that prevent or slow down the process of communication. We call them barriers to communication. These include: physical, socio-cultural, psychological, technical or mechanical.

1. Physical Barriers

- **Geographical distance** may also create barriers, as people may like to communicate with one another but due to physical distances may not be able to do so.
- **Noise:** Physical barrier includes all kinds of 'Noise' which affect the communication process. In communication science, 'noise' means anything that adversely affects the communication process. Noise may be channel noise or semantic noise.
- **Channel noise:** Channel noise is due to the barrier, the instrument. This kind of noise originates outside the head of the one who receives the message. The message may be lost or distorted as a result of these kinds of noises. The best way to avoid or minimize channel noise is to correct or control the noise through mechanical or other ways, ' to seek feedback from those who have received the message or to repeat the message.
- **Semantic noise:** Semantic noise on the other hand, refers to the noise within the receiver and relates to the relationship between the word, symbols and their meaning. It may be the result of differences between the sender and the receiver with regard to age, educational background, attitudes and experiences, knowledge of the language and meaning of words used in communication etc.
- **Time and Distance:** Physical distances between people can create major problems in communication. Time zones around the world are not same. Due to differences in timings between countries we have to adjust with the time difference of that country.
- **Physical discomfort:** Student may fell discomfort due to the insufficient necessary internal or external equipment in the class room like fan, light, air, etc. for these reason, they may lose their interest to hear the lecture of their teachers. This type of barrier should also be considered in a classroom for proper communication between students and teachers.
- **High Temperature and Humidity:** Excess Temperature or heat or cold Temperature create difficulties in communication Many times human physical defects such as stammering ,bad hearing, failure of communication channels and bad handwriting also create misunderstanding in learning the message.
- **Imperceptions:** Students are not be able to understand the teacher's important class lecture if they have any physical problem. Psychological function can do nothing in this case. So students may gather knowledge very superficially in class room thus communication fails.

2. Socio-Cultural Barriers

- **Concept of Time :** The time is not perceived similarly across the cultures. In Western culture Time is important. In Asian culture Time is taken leisurely. The concept of punctuality differs in cultures.
- **Assumptions about social strata or caste system:** Caste system is observed in India. But in every culture some kind or differences in the society in the form of religion, community differences or sects or class division is observed. We should not always assume someone superior or inferior because of caste or class system.
- **Etiquettes and Mannerisms:** In every society or cultures different types of mannerisms are observed. This includes rule of behaviors or how to follow certain code of conduct.
- **Expression:** Communication is never exact. The initiator tries to put his ideas into words, and then the recipient has to decode those words to understand the idea.
- **Body Language methods around the world are not same.** There can be misunderstandings because of this.
- **Proximity(Concept of Space)differs from culture to culture.** In some culture close distance between people is not approved. In some culture close distance is accepted. Value system is not same across the cultures.
- **Values or good behavior or ethical principles** guide in our life. But the methods of these value system is not same around the world.
- **Disinterest:** Disinterest arises among the students due to the lack of available teaching materials, teaching system and efficient teacher in the classroom. To eradicate distance teacher should include some motion pictures, films, modems, specimens, film strips, charts, diagrams, tapes, records, television and many other audio visual materials. Variety in class room procedures and teaching materials usually heightens the interest and enthusiasm with which pupils approach their work.

3. Psychological Barriers

- **Anxiety:** One of the major emotional causes of communication barriers is a student's anxiety. If a student is anxious and unsure, they're less likely to speak up in class.
- **Ego:** Ego barriers create conflict in human relations.
- **Prejudice:** bias (wrong opinion) about people on the basis of community, caste, religions or on personal basis is very negative for communication. Prejudice can hamper the communication.

- **Emotions and feelings:** Emotional Disturbances of the sender or receiver can distort[change] the communication.
- **Halo Effect:** like or dislike about a person can create halo or horn effect. This can affect communication.
- **Self Image:** Positive or Negative image about self is the way of looking at the world. Negative self-image can destroy or hamper communication . Such people always think negatively and do not look at the things or events properly.
- **Filtering in Messages:** Messages are filtered [changed] intentionally. We always try to defend ourselves or protect ourselves during some problems so that many times messages are changed by the inferiors
- **Closed Mind:** Most of the time our minds are closed or not able to learn new things. With old age or change in attitude this problem is observed. This is also a very barrier in communication.
- **Status:** Status create barriers in the employees . Higher or lower status create obstacles in thinking or mixing with people. People keep distance while communicating due to status barriers.
- **Perceptions:** The way we look at the world or attitude determines our Communication strategy. Wrong or negative perceptions can create difficulty in communication . People who have negative perceptions or think negatively look at everything or event negatively.
- **Poor Retention:** ability to retain the message or remember is important. But if it is poor then communication becomes difficult.
- **Interest and Attitudes:** Interests and Attitudes of people determines communication strategy. Lack of interest or wrong attitude can lead improper communication.
- **Day-Dreaming:** A common (though avoidable) barrier to effective communication occurs when the learner day dreams, that is when he turn away from the flow of classroom communication and dwells upon his own privately recalled understanding and experiences, which are more preoccupying than those which are identified with classroom activity. Students are failed to keep their full attention in the class room, if they think the movie that was seen by them in previous night. As a result they cannot give their proper attention to the lecture of the important teachers that creates a great problem in class room communication. This barrier can be lessened or surmounted by. Increasing the understandability of class room communication through the use of effective audio visual class room techniques.

4. Technical Barriers

These include mechanical defects with instruments used for communication, the unfamiliarity of those who use them, defect in speech, mispronunciation of words, poor or inaccurate choice of words, poor printing of texts, poor mike microphones or sound system etc. which can hamper communication.

5. Linguistic and Language barriers

During the process of communication, faulty expressions, poor translation, verbosity, ambiguous words and inappropriate vocabulary create barriers. Moreover, words and symbols used to communicate facts and information may mean different things to different persons. This is due to the fact that meanings are in the minds of people who perceive and interpret meanings in different ways according to their individual frame of mind.

Following are some of the examples of language barriers.

- Verbalism
- Different Languages or lack of Common Language
- Multiplicity of words
- Words with similar pronunciation but different meaning (Homophones)
- Jargon words (Technical words)
- By-passed Instructions or short-cuts

6. Barriers Due to Information Overload

At times too much information is imparted which we may not able to comprehend and assimilate, thus creating a barrier in communication.

7. Some Other Barriers

- Lock of credibility
- Reference Confusion
- Lack of common experience
- Gender barrier
- Age factors

How to Overcome the Barriers?

The teacher in the classroom can prevent this problem through the following measures:

- The teacher should speak at the levels of the pupils using clear, simple, and concise words that will be meaningful to them;
- Use an appropriate channel in impacting the needed knowledge;
- Encourage quick feedback;
- Use in most cases face-to-face communication;
- Emphasis the salient points in teaching through repetition of the points; and
- Each the lesson with appropriate instructional materials and the teacher's action should correlate his communication.

Communication Barriers in Teaching Learning Process

There are certain effective communication obstacles which when not adequately considered and avoided may impede learning in the classroom. Some of these obstacles are:

- Inadequate verbal communication skill of speaking and listening;
- Problems of meaning;
- Contradicting verbal and non-verbal message;
- Noise in the environment;
- Distortion;
- Message overloading;
- Wrong timing;
- Perception problem;
- Auditory problem; and
- Psychological problem, among others, hindering classroom effective communication.

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EXERCISE

1. Firewalls are used to protect a communication network system against: **[December-2008]**
(a) Unauthorized attacks (b) Virus attacks
(c) Data-driven attacks (c) Fire-attacks

2. In communication, a major barrier to reception of messages is **[June-2010]**
(a) audience attitude (b) audience knowledge
(c) audience education (d) audience income

3. A major barrier in the transmission of cognitive data in the process of communication is an individual's **[June-2011]**
(a) personality (b) expectation
(c) social status (d) coding ability

4. Communication issues at the international level are addressed by **[September-2013]**
(a) ILO (b) ITU
(c) UNDP (d) UNESCO

5. What are the barriers to effective communication ? **[July-2016]**
(a) Moralising, being judgemental and comments of consolation.
(b) Dialogue, summary and self-review.
(c) Use of simple words, cool reaction and defensive attitude.
(d) Personal statements, eye contact and simple narration.

6. We listen attentively to and favourably interpret messages which boost our self image, and reject or misinterpret messages which threaten that image. This is called: **[25th June 2019-Ist Shift]**
(a) communication selectivity
(b) change resistance
(c) image rationalisation
(d) communication distortion

7. Some of the barriers to effective communication are: **[20th June 2019-Ist Shift]**
(A) Polysemy
(B) Simple language
(C) Use of Cliche's
(D) Easy construction of sentences
Choose the correct answer from the codes given below:
(a) (A) and (B) (b) (B) and (C)
(c) (C) and (D) (d) (A) and (C)

8. Which of the following are barriers to effective communication? **[21st June 2019-Ist Shift]**
(1) Physical noise
(2) Semantic noise
(3) Psychological noise
(4) Non-semantic noise
Choose the correct answer from the options given below.
(a) (1), (2) and (4) (b) (1), (2) and (3)
(c) (1), (3) and (4) (d) (1) and (4) only

9. 'Non-content behaviours such as rate of speaking, loudness, tendency to interrupt and pronunciation peculiarities' are referred to as _____ behaviour. **[21st June 2019-Ist Shift]**
(a) Extra-personal (b) Animated
(c) Extra-linguistic (d) Involuntary

10. Semantic barrier of communication is implied when the: **[24th June 2019-IInd Shift]**
(a) signal is lost before reaching the receiver.
(b) message transmitted by the source is unclear.
(c) receiver's attention is diverted.
(d) receiver does not understand the meaning of the message.

11. Which of the following will help overcome communication barriers? **[6th Dec. 2019-IInd Shift]**
(a) Focused listening
(b) Neglecting semantic noise
(c) Top-down command structure
(d) Use of cliched idioms

12. Since most interactions with other people take place at a highly superficial level, making good _____ becomes difficult. **[25th June 2019-Ist Shift]**
(a) Course corrections (b) Predictions
(c) Deeds (d) Announcements

HINTS & EXPLANATION

1. (a) In computing, a firewall is a network security system that monitors and controls incoming and outgoing network traffic based on predetermined security rules. A firewall typically establishes a barrier between a trusted internal network and untrustworthy external network, such as the Internet.

2. (a) A communication barrier is anything that prevents one from receiving and understanding the intended messages. Barriers could be internal, related to thoughts and feelings, or external, related to other factors; and could be sender-oriented or receiver-oriented. The receiver's attitude, belief, position, hearing impairment, dissensions are barriers. The receiver's knowledge, education or income is not significant in communication.

3. (d) Coding means information processing, i.e., interpreting information (word, sound, image, or gesture) or using a system of rules to convert it into another form or representation, for communication through a communication channel or storage in a storage medium. When it comes to cognitive data, i.e., data that requires understanding, the receiver's inability to decode becomes a major barrier in communication..

4. (d) UNESCO is the United Nations Educational, Scientific and Cultural Organization. It seeks to build peace through international cooperation in Education, the Sciences and Culture. UNESCO's programmes contribute to the achievement of the Sustainable Development Goals defined in Agenda 2030, adopted by the UN General Assembly in 2015.

UNDP is the United Nations Development Programme. It works to eradicate poverty and reduce inequalities through the sustainable development

ILO is the United Nations International Labour organisation. It brings together governments, employers and workers of member countries to set labour standards, develop policies and devise programmes promoting decent work for all women and men.

ITU is the United Nations specialized agency responsible for issues that concern information and communication technologies – ICTs.

5. (a) A communication barrier is anything that prevents one from receiving and understanding the messages others use to convey their information, ideas and thoughts. These may be internal barriers, related to thoughts and feelings; or external barriers. Moralising, being judgemental or offering comments of consolation are such kinds of barriers in effective communication.

6. (a) When a message communicated is received selectively it is called communication selectivity.

7. (d) Simple and easy language facilitates understanding.
Polysemy refers to the coexistence of many possible meanings for a word or phrase. Use of such terms complicates the meaning and fails to communicate the desired message.
Cliche is a phrase or opinion that is overused and betrays a lack of original thought. Cliches take away the intended impact.

8. (b) Noise in communication is any distraction that keeps a receiver from comprehending a message completely. The four kinds of noise are:
Physical noise includes environmental noise like that of traffic, music, others' talking/ whispering, hearing impairment, etc., or physical condition of illness, intoxication, tiredness, etc.
Semantic noise includes hindrance to understanding caused by pedantic vocabulary or regional colloquialisms, illegible verbal cues, etc.
Psychological noise includes overpowering emotions, prejudices, narrow-mindedness and personal bias, etc.
Physiological noise is a distraction caused by some physiological process like physical and chemical changes caused by hunger, fatigue, headache, medicine effect, etc.

9. (c) Linguistic content or words of a language of communication make up only a small portion of observable behaviour. The non-content aspects of behaviour, such as rate of speaking, loudness, tendency to interrupt, and pronunciation peculiarities, constitute extra-linguistic behaviour or *paralanguage* or 'body language', e.g., vocal pitch accurately measures emotional state.

10. (d) The term 'semantic' pertains to meaning in language or logic. Semantic barrier is implied when meaning is not received.

11. (a) Lack of good listening skills is a communication barrier. Listening intently or with focus ensures that no message is missed which is crucial to communication process.
Semantic noise refers to ambiguity in words, sentences or symbols which disturbs the transmission of the message and interferes with the interpretation of the message. It is a communication barrier which must be taken care of and not be neglected.
Top down command structure (hierarchy) hampers the smooth flow of communication. Information often is filtered as it moves up and down the chain of command, watering down the message or changing the nature of the information.
Use of clichéd idioms is a communication barrier as it makes the audience squirm and shifts focus.

12. (b) Communication happens at four levels:
(i) Social/superficial level where we talk about day to day affairs with strangers. Making any kind of prediction is not possible in such communication.
(ii) Mental level at which we talk about ideas, facts, plans, strategies, etc., mostly in our profession.
(iii) Emotional level where we talk about our wants, needs, , fears, joys, aspirations, achievements, etc., with our friends and relations and get emotionally charged.
(iv) Spiritual level which forges a deep, direct connection with no distortion from social, mental, or emotional .
Mental, emotional and spiritual levels involve understanding/ perceiving; so, predictions are easy.

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CHAPTER 17

Mass-Media and Society

MASS-MEDIA AND SOCIETY

Mass media refers to the methods technologies used as channels for a small group of people to communicate with a larger number of people. The mass media include a wide variety of forms, including television, newspapers, films, magazines, radio, advertisements, video games and CDs. They are referred to as 'mass' media because they reach mass audiences – audiences comprised of very large numbers of people.

TYPES OF MASS MEDIA

Mass media can be classified according to their physical form, the technology involved and the nature of the communication process. The general classification on this basis is as follows:

a. Traditional Media
b. Print Media
c. Electronic Media
d. New Media

a. Traditional Media

Traditional media are the oldest form of media and are connected with the folk art forms of the society. Traditional media connect people with their rich heritage and tell the stories of the past to the present generation. The folk art forms are closely related with the rituals of agrarian and marginalized groups. These traditional art forms like song, dance, music and theatre in such societies are considered as traditional media since they inform, educate and entertain people by oral tradition. The traditional media are communication channels which reflect people's culture. It has more influence on public opinion than the other form of media.

b. Print Media

For several centuries, print media has served as the major means of communication reaching a wide audience.

Major forms of print media are: Newspapers; Magazines and periodicals; and Books.

Newspapers

As a mass medium, newspapers influence people in many significant ways. Capability to be used for future reference and diversity of content are major features.

Magazines and Periodicals

Magazine is a collection of materials like stories, poems, and other items.

Magazines are published at regular intervals. According to their periodicity, magazines are categorized as weekly, biweekly or fortnightly, monthly, bi-monthly, quarterly, half-yearly and yearly.

Books

Earlier books were hand written and were called manuscripts. The printed books appeared in 868 A.D.

- Books are portable and compact, and thus have an advantage over other media forms.
- Unlike other print media, books most often deal with a single subject.
- Unlike magazines and newspapers, books are relevant for longer period and stored in public or private libraries.
- Books have an index which helps the reader to navigate from one chapter to the other.

The Effects of Print Media on Society

- The press plays a vital role in exposing the social concerns, encouraging popular discussions and debates, mobilizing public opinion and generating movements for political and social reform.

c. Electronic Media

The term electronic media mainly includes

1. Film 2. Radio 3. Television

d. New Media

- Online and digital means of producing, transmitting and receiving messages are called new media. The invention of the Internet and the World Wide Web opened up several new avenues for mass communication which include e-mail, websites, podcasts, e-books, blogging, social networking sites, Internet Protocol Television, Internet radio and the like.

Functions of Mass Media

In a society like ours, mass media have a responsible role to play in fostering democracy, plurality and communal harmony through the functions listed below:

1. Information and education.
2. Socialization
3. Entertainment
4. Political awareness
5. Cultural transmission
6. Catalyst to development

EXERCISE

1. Which is the oldest soap opera telecasted in India ? **[December-2004]**
(a) Kahani Ghar Ghar Ki (b) Buniad
(c) Humlog (d) Saas bhi Kabhi Bahu Thee

2. Which satellite channel uses the adline, "Knowing is everything" ? **[December-2004]**
(a) BBC World (b) Star
(c) Sony (d) Zee

3. Which is the "First made in India" Kids channel of television? **[December-2004]**
(a) Cartoon Network
(b) Walt Disney
(c) United Home Entertainment's Hungama TV
(d) Nick Jr.

4. Which of the following pair is not correctly matched ? **[December-2004]**
(a) Aajtak - 24 hours news channel
(b) F.M. Stations - Radio
(c) National Geography channel - Television
(d) Vir Sanghvi - India Today

5. The "Report on Currency and Finance" for each of the financial year in India is published by: **[December-2004]**
(a) Reserve Bank of India
(b) Ministry of Finance
(c) Planning Commission
(d) Central Statistical Organisation

6. The launch of satellite channel by IGNOU on 26th January 2003 for technological education for the growth and development of distance education is : **[December-2005]**
(a) Eklavya channel (b) Rajrishi channel
(c) Gyandarshan channel (d) None of these

7. An electronic bill board that has a short text or graphical advertising message is referred to as: **[December-2005]**
(a) bulletin (b) strap
(c) bridge line (d) banner

8. The largest number of newspapers in India is published from the state of : **[December-2005]**
(a) Kerala (b) Maharashtra
(c) West Bengal (d) Uttar Pradesh

9. Recording a television programme on a VCR is an example of : **[December-2005]**
(a) time-shifting (b) content reference
(c) mechanical clarity (d) media synchronisation

10. Networked media exist in inter-connected: **[June-2006]**
(a) social environments
(b) economic environments
(c) political environments
(d) technological environments

11. The function of mass communication of supplying information regarding the processes, issues, events and societal developments is known as: **[June-2006]**
(a) content supply (b) surveillance
(c) gratification (d) correlation

12. The combination of computing, telecommunications and media in a digital atmosphere is referred to as: **[June-2006]**
(a) online communication (b) integrated media
(c) digital combine (d) convergence

13. "Because you deserve to know" is the punchline used by: **[December-2006]**
(a) The Times of India (b) The Hindu
(c) Indian Express (d) Hindustan Times

14. Which of the following pair is not correctly matched? **[December-2006]**
(a) N. Ram: The Hindu
(b) Barkha Dutt : Zee News
(c) Pranay Roy: NDTV 24×7
(d) Prabhu Chawla: Aaj tak

15. Consider the following statements in communication: **[December-2006]**
(i) Hema Malini is the Chairperson of the Children's Film Society, India.
(ii) Yash Chopra is the Chairman of the Central Board of Film Certification of India.
(iii) Sharmila Tagore is the Chairperson of National Film Development Corporation.
(iv) Dilip Kumar, Raj Kapoor and Preeti Zinta have all been recipients of Dada Saheb Phalke Award.
Which of the statements given above is/are correct?
(a) (i) and (iii) (b) (ii) and (iii)
(c) (iv) only (d) (iii) only

16. Which is the 24 hours English Business news channel in India? **[December-2006]**
(a) Zee News (b) NDTV 24×7
(c) CNBC (d) India News

17. Networking of libraries through electronic media is known as: **[June-2007]**
(a) Inflibnet (b) Libinfnet
(c) Internet (d) HTML

18. The aspect ratio of TV screen is: **[June-2007]**
(a) 4:3 (b) 4:2
(c) 3:5 (d) 2:3

19. Collection of information in advance before designing communication strategy is known as: **[June-2007]**
(a) Feed-back (b) Feed-forward
(c) Research study (d) Opinion poll

20. Feed-back of a message comes from: **[June-2007]**
(a) Satellite (b) Media
(c) Audience (d) Communicator

21. Adjusting the photo for publication by cutting is technically known as: **[June-2007]**
(a) Photo cutting (b) Photo bleeding
(c) Photo cropping (d) Photo adjustment

22. Press Council of India is located at: **[June-2007]**
(a) Chennai (b) Mumbai
(c) Kolkata (d) Delhi

23. Exclusive educational channel of IGNOU is known as: **[December-2007]**
(a) Gyandarshan (b) Cyan Vani
(c) Doordarshan (d) Prasar Bharati

24. The first Indian Satellite for serving the educational sector is known as: **[December-2007]**
(a) SATEDU (b) INSAT - B
(c) EDUSAT (d) INSAT-C

25. National Press day is celebrated on: **[December-2007]**
(a) 16th November (b) 19th November
(c) 21th November (d) 30th November

26. DTH service was started in the year: **[December-2007]**
(a) 2000 (b) 2002
(c) 2004 (d) 2006

27. Prasar Bharati was launched in the year: **[June-2008]**
(a) 1995 (b) 1997
(c) 1999 (d) 2001

28. The biggest news agency of India is: **[June-2008]**
(a) PTI (b) UNI
(c) NANAP (d) Samachar Bharati

29. All India Radio before 1936 was known as: **[June-2008]**
(a) Indian Radio Broadcasting
(b) Broadcasting Service of India
(c) Indian Broadcasting Service
(d) All India Broadcasting Service

30. Which broadcasting system for TV is followed in India? **[June-2008]**
(a) NTSE (b) PAL
(c) SECAM (d) NTCS

31. Community Radio is a type of radio service that caters to the interest of: **[December-2008]**
(a) Local audience (b) Education
(c) Entertainment (d) News

32. Which is not online Indian Matrimonial website? **[June-2009]**
(a) www.jeevansathi.com
(b) www.bharatmatrimony.com
(c) www.shaadi.com
(d) www.u.k.singlemuslim.com

33. What is blog? **[June-2009]**
(a) Online music
(b) Intranet
(c) A personal or corporate website in the form of an online journal
(d) A personal or corporate Google search

34. The main objective of F.M. station in radio is: **[June-2009]**
(a) Information, Entertainment and Tourism
(b) Entertainment, Information and Interaction
(c) Tourism, Interaction and Entertainment
(d) Entertainment only

35. Which is not 24 hours news channel? **[June-2009]**
(a) NDTV24x7 (b) ZEE News
(c) Aajtak (d) Lok Sabha channel

36. Which one of the following Telephonic Conferencing with a radio link is very popular throughout the world? **[June-2009]**
(a) TPS (b) Telepresence
(c) Video conference (d) Video teletext

37. Which among the following gives more freedom to the learner to interact? **[June-2009]**
(a) Use of film
(b) Small group discussion
(c) Lectures by experts
(d) Viewing country-wide classroom programme on TV

38. The site that played a major role during the terrorist attack on Mumbai (26/11) in 2008 was **[December-2009]**
(a) Orkut (b) Facebook
(c) Amazon.com (d) Twitter

39. Which of the following statements is not connected with communication? **[December-2009]**
(a) Medium is the message.
(b) The world is an electronic cocoon.
(c) Information is power.
(d) Telepathy is technological.

40. The country which has the distinction of having the two largest circulated newspapers in the world is **[December-2009]**
(a) Great Britain (b) The United States
(c) Japan (d) China

41. Post-modernism is associated with **[June-2010]**
(a) newspapers (b) magazines
(c) radio (d) television

42. **Assertion (A) :** Mass media promote a culture of violence in the society.
Reason (R) : Because violence sells in the market as people themselves are violent in character. **[June-2010]**
(a) Both (A) and (R) are true and (R) is the correct explanation of (a).
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
(c) (A) is true, but (R) is false.
(d) Both (a) and (R) are false.

43. In analog mass communication, stories are **[December-2010]**
(a) static (b) dynamic
(c) interactive (d) exploratory

44. An example of asynchronous medium is **[December-2010]**
(a) Radio (b) Television
(c) Film (d) Newspaper

45. The information function of mass communication is described as **[December-2010]**
(a) diffusion (b) publicity
(c) surveillance (d) diversion

46. Media that exist in an interconnected series of communication – points are referred to as **[December-2010]**
(a) Networked media (b) Connective media
(c) Nodal media (d) Multimedia

47. In mass communication, selective perception is dependent on the receiver's **[June-2011]**
(a) competence (b) pre-disposition
(c) receptivity (d) ethnicity

48. Aspect ratio of TV Screen is **[December-2011]**
(a) 4 : 3 (b) 3 : 4
(c) 2 : 3 (d) 2 : 4

49. In which language the newspapers have highest circulation? **[December-2011]**
(a) English (b) Hindi
(c) Bengali (d) Tamil

50. The pioneer of the silent feature film in India was **[December-2012]**
(a) K.A. Abbas (b) Satyajit Ray
(c) B.R. Chopra (d) Dada Sahib Phalke

51. The largest circulated daily newspaper among the following is **[December-2012]**
(a) The Times of India (b) The Indian Express
(c) The Hindu (d) The Deccan Herald

52. Communication via New media such as computers, teleshopping, internet and mobile telephony is termed as **[June-2013]**
(a) Entertainment
(b) Interactive communication
(c) Developmental communication
(d) Communitarian

53. Manuel Castelle was the first to use the term **[September-2013]**
(a) Internet society (b) Electronic society
(c) Network society (d) Telematic society

54. Referential framing used by TV audience connects media with **[September-2013]**
(a) reality (b) falsity
(c) negativity (d) passivity

55. Which of the following is a social network ? **[December-2013]**
(a) amazon.com (b) eBay
(c) gmail.com (d) Twitter

56. Virtual reality provides **[December-2013]**
(a) Sharp pictures (b) Individual audio
(c) Participatory experience (d) Preview of new films

57. The initial efforts for internet based communication was for **[December-2013]**
(a) Commercial communication
(b) Military purposes
(c) Personal interaction
(d) Political campaigns

58. The first multi-lingual news agency of India was **[December-2013]**
(a) Samachar (b) API
(c) Hindustan Samachar (d) Samachar Bharati

59. Ideological codes shape our collective **[December-2013]**
(a) Productions (b) Perceptions
(c) Consumptions (d) Creations

60. Users who use media for their own ends are identified as **[December-2013]**
(a) Passive audience (b) Active audience
(c) Positive audience (d) Negative audience

61. The grains that appear on a television set when operated are also referred to as **[June-2014]**
(a) sparks (b) green dots
(c) snow (d) rain drops

62. Media is known as **[December-2014]**
(a) First Estate (b) Second Estate
(c) Third Estate (d) Fourth Estate

63. The term "Yellow Journalism" refers to **[December-2014]**
(a) Sensational news about terrorism and violence
(b) Sensationalism and exaggeration to attract readers / viewers.
(c) Sensational news about arts and culture.
(d) Sensational news prints in yellow paper.

64. In a classroom, the probability of message reception can be enhanced by : **[November-2017]**
(a) Establishing a viewpoint
(b) Exposing the ignorance of students
(c) Increasing the information load
(d) Using high decibel audio tools

65. Which one of the following is known as fourth estate? **[December-2018]**
(a) Media
(b) Judiciary
(c) Office of the President of India
(d) Parliament

66. The dance of the honeybee conveying to other bees where nectar will be found is an example of: **[24th June 2019-Ist Shift]**
(a) Mass communication
(b) Group communication
(c) Interpersonal communication
(d) Intrapersonal communication

67. Which of the following is a function of mass media? **[24th June 2019-Ist Shift]**
(a) To transmit culture.
(b) To formulate national policies.
(c) To help the judiciary take its decisions.
(d) To stabilise the share market.

68. Today's media – society equation is largely: [24th **June 2019-Ist Shift]**
(a) Mystical
(b) Morally bound
(c) Consumer conscious
(d) Tradition centric

69. Which of the following NOT correctly matched? [24th **June 2019-Ist Shift]**
(i) Gyan Darshan – Satellite based educational T.V. channel
(ii) Gyan Vani – Educational FM radio network
(iii) MOOCs – Massive open online credits
Choose the correct answer from the options given below:
(a) only (i) and (ii) (b) only (ii) and (iii)
(c) only (iii) (d) only (i) and (iii)

70. Which of the following is a characteristic of modern mass media? **[24th June 2019-IInd Shift]**
(a) Capital intensive (b) Labour intensive
(c) Sustainable (d) Developmental

71. In both mass communication and classroom communication, filtering of information and contents is referred to as **[25th June 2019-Ist Shift]**
(a) Rationalisation (b) Gate keeping
(c) Content correction (d) One – way flow

72. Gate keeping by Media to ensure what audiences consume is indicative of **[25th June 2019-IInd Shift]**
(a) The audience voice is Media Programming
(b) Media control on society
(c) Feedback received by the media
(d) Media role in-creating culture

73. Match Set 'A' with Set 'B'.

Set A (Media)	Set B (Transmission/ Communication)
(A). Audio	(i). Bandwidth
(B). Advertising	(ii). Linear Communication
(C). Internet	(iii). Non personal Communication
(D). Newspaper	(iv). Frequency Modulation

Choose the correct answer from the options given below: **[26th June 2019-Ist Shift]**

	(A)	(B)	(C)	(D)
(a)	(iii)	(iv)	(ii)	(i)
(b)	(i)	(ii)	(iii)	(iv)
(c)	(iv)	(iii)	(i)	(ii)
(d)	(ii)	(i)	(iv)	(iii)

74. Mass media do not have pre-determined functions for everyone and people use them the way they like. This is suggestive of the fact that, **[26th June 2019-Ist Shift]**
(a) Audiences are active
(b) Content is of little significance
(c) Content lacks plurality
(d) Audiences are homogeneous

75. **Assertion (A):** The correlation function of mass media is vital for any society.
Reason (R): The interpretational aspects that include advertising and public relations shape and influence public opinion.
Choose the correct answer from the codes given below: **[20th June 2019-Ist Shift]**
Codes:
(a) Both (A) and (R) are true, and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
(c) (A) is true, but (R) is false.
(d) (A) is false, but (R) is true.

76. **Assertion (A):** Media entertainment does not enhance the cultural level of society. **[20th June 2019-IInd Shift]**
Reason (R): Most media entertainment encourages escapism, not content quality.
Choose the correct answer from the options given below:
(a) Both (A) and (R) are true, and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A)
(c) (A) is true, but (R) is false
(d) (A) is false, but (R) is true

77. Identify the ways that would be followed by a public sector organization to communicate with public by organizing an open house: **[5th Dec. 2019-Ist Shift]**
(A) Publicity (B) Lobbying
(C) Public relations (D) Image building
Choose the correct option:
(a) (A), (C) and (D) (b) (B), (C) and (D)
(c) (A), (B) and (D) (d) (A), (B) and (C)

78. Match the following communication channels with their distinguishing type: **[5th Dec. 2019-Ist Shift]**

Set I (Communication Channel)	Set II (Distinguishing Type)
(A) Blogging	(i) Electronic Media
(B) Television	(ii) Print Media
(C) Periodicals	(iii) Social Media
(D) Collection sites	(iv) World wide web

Choose the correct option from those given below:
(a) (A)-(iv), (B)-(ii), (C)-(i), (D)-(iii)
(b) (A)-(ii), (B)-(iv), (C)-(iii), (D)-(i)
(c) (A)-(i), (B)-(iii), (C)-(iv), (D)-(ii)
(d) (A)-(iii), (B)-(i), (C)-(ii), (D)-(iv)

79. Given below are two statements » one is labelled as Assertion (A) and the other is labelled as Reason (R): **[4th Dec. 2019-IInd Shift]**
Assertion (A): A blog is a form of social media.
Reason (R): A blog allows anyone to communicate to a public audience.
In the light of the above two statements, choose the correct option.
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true and (R) is not the correct explanation of (A)
(c) (A) is true, but (R) is false
(d) (A) is false, but (R) is true

HINTS & EXPLANATION

1. (c) Hum Log, the serial that revolutionised Indian television started on July 7, 1984, was the story of a middle class family and its struggles and aspirations.

2. (a) BBC World News's tagline is the 'knowing is everything.'

3. (c) The 'First made in India' Kids channel of television was United Home Entertainment's Hungama TV.

4. (d) Vir Sanghvi is an Indian print and television journalist, columnist, and talk show host. He has been a member of many professional, academic and government bodies including the National Integration Council.

5. (a) The 'Report on Currency and Finance' for each of the financial year in India is published by Reserve Bank of India.

6. (a) Indira Gandhi National Open University (IGNOU) has launched a TV channel dedicated to science and technology programmes namely Eklavya Technology Channel.

7. (d) A banner can be a flag or other piece of cloth bearing a symbol, logo, slogan or other message.

8. (d) Uttar Pradesh tops the list with more than 16000 registrations followed by Maharashtra with more than 14000. Delhi, Madhya Pradesh, Andhra Pradesh & Rajasthan follow in that order.

9. (d) Synchronization means co-ordination various events to operate a system in unison. Media synchronization refers to the coordination of multimedia information along three axes: content, space, and time. It involves sending timing references in each media stream that can be used to align and adjust the relative timing of multiple media signals.

10. (d) Network media refers to the communication channels used to interconnect nodes on a computer network. Typical examples of network media include copper coaxial cable, copper twisted pair cables and optical fiber cables used in wired networks, and radio waves used in wireless data communications networks. Networked media exist in inter-connected technological environments.

11. (d) correlation

Mass communication has four functions: Surveillance, Correlation (or consensus), Cultural transmission and Entertainment.

Mass communication presents information facts that may not be objective or without bias. In supplying information regarding the processes, issues, events and societal developments, the media performs its correlation function of enabling an individual to know the opinions of various people, which help him to evaluate an issue.

12. (d) Media convergence is the interlinking of computing and other information technologies, media content, media companies and communication networks that have arisen as the result of the evolution and popularization of the Internet as well as the activities, products and services that have emerged in the digital media space.

13. (d) "Because you deserve to know" is the punch line of Hindustan Times, an Indian English-language daily newspaper founded in 1924.

14. (b) Barkha Dutt is an Indian television journalist and author. She was part of NDTV's team for 21 years, until she left the channel in January 2017.

15. (b) In 2000, Hema Malini was appointed as the first female chairperson of the National Film Development Corporation for a term of three years. Priety Zinta has not been conferred with the Dada Saheb Phalke Award.

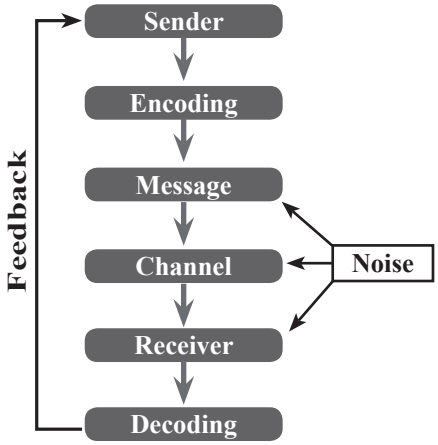
16. (c) CNBC is the 24 hours English Business news channel in India.

17. (a) INFormation and LIBrary NETwork (INFLIBNET) is an Autonomous Inter-University Centre (IUC) of University Grants Commission (UGC) involved in creating infrastructure for the sharing of library and information resources and services among the academic and research institutions.

18. (a) Earlier televisions have been made in a square shape called a 4:3 or 1.33 to 1 aspect ratio. Since HDTV has become standard, TVs are now made in a rectangular shape referred to as a 16:9 or 1.78 to 1 aspect ratio. TV programs and DVDs are recorded in both square formats (4:3) and wide screen formats (16:9).

19. (d) It is a survey conducted to gauge the mood and opinion regarding a particular topic or more. Trained interviewers seek responses from people chosen at random from a representative sample of the population, usually for the purpose of forecasting the results of voting.

20. (c) The communication flow is as follows: create the figure



Decoding, as shown in the figure, is done by the audience that, thereafter, provides the feedback.

21. (c) Photo cropping is the process of trimming the edges of a photo, either digitally with photo processing software, or physically when a print is trimmed with a knife or guillotine.

22. (d) The Press Council of India was first set up in the year 1966 by the Parliament on the recommendations of the First Press Commission with the object of preserving the freedom of the press and maintaining and improving the standards of press in India. Press Council of India is located at Delhi.

23. (a) DD Gyandarshan 1 is a state owned television channel telecasting from Doordarshan, Kendra, IGNOU.

24. (c) GSAT-3, known as EDUSAT is meant for distant class room education from school level to higher education. This was the first dedicated "Educational Satellite" that provides the country with satellite based two way communication to class room for delivering educational materials.

25. (a) The National Press Day (NPD) is celebrated every year on November 16 as a symbolic of a free and responsible press in India.

26. (c) DD Free Dish, the first free DTH service in India, was launched by public broadcaster Prasar Bharati in December 2004.

27. (b) The Prasar Bharati was established on November 23, 1997 and consists of Akashvani (All India Radio) and Doordarshan.

28. (a) The Press Trust of India Ltd., commonly known as PTI, is the largest news agency in India. It is headquartered in New Delhi and is a nonprofit cooperative among more than 500 Indian newspapers.

29. (c) The Indian State Broadcasting Service (ISBS) began on 1 April 1930 on an experimental basis for two years, and permanently in May 1932 it then went on to become All India Radio on 8 June 1936.

30. (b) Phase Alternating Line (PAL) is a colour encoding system for analogue television used in broadcast television systems in most countries including India broadcasting at 625-line/50 field (25 frame) per second (576i).

31. (a) Community radio is owned, operated, and influenced by the local community it caters to and broadcasts content that is relevant to, and popular among, the community audience.

32. (d) SingleMuslim.com is a website designed for and marketed to Muslims. The website was launched on 1 August 2000, and its headquarters is in Wakefield, West Yorkshire, England.

33. (c) A blog is a discussion or informational website published on the World Wide Web consisting of discrete, often informal diary-style text entries.

34. (b) FM broadcasting began on 23 July 1977 in Chennai, and was expanded during the 1990s. The main objective of F.M. station in radio is entertainment, information and interaction.

35. (d) Lok Sabha TV is an Indian cable television network channel from Government of India that offers coverage of Lok Sabha proceedings and other public affairs programs.

36. (c) A point-to-point (two-person) video conferencing system works much like a video telephone. Each participant has a video camera, microphone, and speakers mounted on his or her computer.

37. (b) Students feel somewhat secure in small groups and interact freely in the absence of the fear of having to address a large group. Watching a film, lecture or countrywide classroom programme on TV is linear communication, restricting students to passive audience.

38. (d) Messages, known as "tweets", were being posted to the site at a rate of around 70 tweets every five seconds when the news of Mumbai attacks first broke. 'Twitter' is an American online news and social networking service on which users post and interact with messages known as "tweets".

39. (d) Telepathy is technological.
Telepathy is the purported transmission of information from one person to another without any known human sensory channels or physical interaction being involved. The term was coined in 1882 by the classical scholar W. H. Frederic.

40. (c) Japan

41. (d) Postmodernism is a broad movement that developed in the mid to late 20th century across philosophy, the arts, architecture, and criticism and that marked a departure from modernism. TV too appeared in the 20th century. Newspaper and magazines came into being as early as the 16th C. Radio was invented in the 1890s.

42. (d) Both (A) and (R) are false.
Mass media are diversified media technologies (print, electronic, etc.) that are intended to communicate to large audiences for the purpose of informing (advertising, transmitting news, etc.)

43. (a) Analog communication is a communication method of conveying voice, data, image, signal or video information using a continuous signal which varies in amplitude, phase, or some other property in proportion to that of a variable. It could be the transfer of an analog source signal using an analog modulation method such as FM or AM, or no modulation at all. Analog mass communication, in use earlier, was largely one way, from a source of message to a relatively large, heterogeneous, anonymous and passive audience. So, it was linear and static, neither interactive nor exploratory. It now refers to all non digitized media, such as print media, audio and video recordings, photography and films. So the contents are linear and static and are not dynamic.

44. (d) A communications medium that does not require both parties to be present at the same time in the same space, e.g., e-mail, Newspaper) is called an asynchronous medium.

45. (c) The first function of mass communication is to serve as the eyes and ears for those seeking information about the world.
role of circulating information and news: one of the most important general roles that the mass media, a particular medium, or factual media genres, can be seen as serving for society as a whole.

46. (a) Network media refers to the communication channels used to interconnect nodes on a computer network. Typical examples of network media include copper coaxial cable (specially engineered with a metal shield and other components to block signal interference in cable television), copper twisted pair wire (normal electrical wire) and optical fibre cables (cables made out of strands of glass fibres inside an insulated casing designed for long distance, very high-performance data networking and telecommunications).

47. (c) Selective perception is the theory that individuals tend to perceive what and how much they want to, based on their individual frame of reference. So, selective perception depends on how receptive the receiver is.

48. (a) Traditionally, televisions have been made in a square shape called a 4:3 or 1.33 to 1 aspect ratio. Now that HDTV has become standard, TVs are now made in a rectangular shape referred to as a 16:9 or 1.78 to 1 aspect ratio.

49. (b) Hindi newspapers have highest circulation. Dainik Jagran (Hindi), Hindustan (Hindi), Dainik Bhaskar (Hindi) are the highest circulated newspapers in India.

50. (d) The first full-length motion picture in India was produced by Dadasaheb Phalke, who is seen as the pioneer of the Indian film industry and a scholar of India's languages and culture. He employed elements from Sanskrit epics to produce his Raja Harishchandra (1913), a silent film in Marathi.

51. (a) The largest circulated daily newspaper in India is The Times of India.

52. (b) Communication via New media such as computers, teleshopping, internet and mobile telephony is termed as Interactive communication. It is an exchange of ideas where both participants, whether human, machine or art form, are active and can have an effect on one another.

53. (c) Network society is the expression coined in 1991 related to the social, political, economic and cultural changes caused by the spread of networked, digital information and communications technologies. Manuel Castells - one of the world's pre-eminent social scientists - has drawn together a stellar group of contributors to explore the patterns and dynamics of the network society in its cultural and institutional diversity.

54. (a) A frame of reference is a particular set of beliefs or ideas on which you base your judgment of things. So, referential framing used by TV audience connects media with reality.

55. (d) Twitter A social networking site is an online platform that enables users to create public profiles within its domain and interact with other users on the website.
Twitter, Facebook, Linkedln, YouTube, lnstagram, Pinterest, Google +are some popular social networking sites.
Gmail is a free email service developed by Google; while amazon.com and eBay are online shopping sites.

56. (c) Virtual reality provides an overview of virtual reality from an education perspective. Defines the technology in terms of equipment and participatory experience, examines the potential applications of virtual reality in education and training, and considers the concerns and limitations of the technology.

57. (b) The initial efforts for internet based communication was for Military purposes.

58. (c) The first multi-lingual news agency of India was Hindustan Samachar. Hindusthan Samachar is a multilingual news agency in India subscribed by more than 200 newspapers and almost all the news channels including Doordarshan (DD). It was set up in 1948 by S. S. Apte.

59. (b) Ideological codes shape our collective perceptions.

60. (b) Users who use media for their own ends are identified as Active audience.

61. (c) The grains that appear on a television set when operated are also referred to as snow.

62. (d) In medieval Europe, the people who participated in the political life of a country were generally divided into three classes or estates. In England they were the three groups with representation in Parliament, namely, the nobility, the clergy, and the common people. Some other group, like the mob or the public press, that had an unofficial but often great influence on public affairs, was called the fourth estate. In the 19th century, fourth estate came to refer exclusively to the press, and now it's applied to all branches of the news media (Merriam-Webster Dictionary).

63. (b) Yellow journalism or yellow press pertains to the use of lurid features like vividly shocking headlines that catch people's attention; crusades against political corruption and social injustice; and sensationalized news to attract readers and increase circulation. It is a type of journalism that does not report fact based real news, rather exaggerates facts in a profit-driven coverage. The phrase was coined in the 1890s to describe the tactics employed in furious competition between two New York City newspapers, the World and the Journal.

64. (a) Communicating with a point of view facilitates the understanding of the receiver. Exposing the ignorance of students invokes negative emotions in them and blocks information processing and cognition. Increasing information overload lowers understanding. As a result of higher cognitive load, a stimulus is more difficult to pay attention to, rehearse and remember, making learning less effective (Sweller, 1988). Using high decibel tools increases cognitive load.

65. (a) Media
The estates of the realm, or three estates, were the broad orders of social hierarchy used in Christian Europe from the medieval period to early modern Europe: the clergy, the nobility and the commoners. The term Fourth Estate refers to the press and news media in modern use deriving from Thomas Carlyle in his book *On Heroes and Hero Worship:* "Burke said there were Three Estates in Parliament; but, in the Reporters' Gallery yonder, there sat a Fourth Estate more important far than they all."

66. (b) Mass Communication: sender disperses information to a large number of receivers in one go.
Intrapersonal communication: a communicator's internal use of language or thought.
Interpersonal Communication: mutual exchange between two communicators.
Group communication: exchange among more than two communicators.
The honeybee dances and communicates with other bees in the group.

67. (a) Mass media plays the constructive role of dispensing information, increasing public awareness, influencing public mind, collecting and conveying public opinion and attitudes towards certain issues. The process transmits the evolving culture of the society.

68. (c) The role of media is to reach new information from the source to the target audience in a one way communication. In the process, it spreads thought and philosophy; informs on union and division of peoples and boundaries; popularises or demonises individuals; builds prejudices; and markets products. Though traditionally, the media prided itself on morality and equality, which lent a mystical character to it; with the rise of a global commercial world; it has steadily moulded a consumerist society. Trade and commerce govern individual as well as national interests. So, the media-society equation today is largely consumer-conscious.

69. (c) **MOOCs** are courses delivered online and accessible to all for free. **MOOC** stands for massive open online course: Massive because enrolments are unlimited and can run into hundreds of thousands.

70. (a) Modern mass media is capital intensive as use of technology and specialist hands requires large investment.
Modern media is constantly growing; so it cannot be called sustainable (maintained at a certain level). It is more technology and machine oriented, hence, not labour intensive. It is more commercialised than developmental (what it traditionally was).

71. (b) Gatekeeping is the process through which information is filtered for dissemination through any mode of communication such as publishing, broadcasting, etc.
In the classroom, the teacher filters information available to prepare a module according to the lesson plan and then transacts the lesson.
The mass media serves four gatekeeping functions: relaying, limiting, expanding, and reinterpreting information.

72. (b) Media reportage, including audiences' voice and receiving feedback from them is part of media's role in creating culture. But when it undertakes to monitor or influence what audiences consume, it is indicative of media's control on society……

73. (c) Audio is transmitted on frequency modulation. Advertising is non personal communication as the advertiser and receivers are not face to face. Internet requires bandwidth of frequency to operate. Newspaper involves linear communication from sender to the masses with no or delayed feedback.

74. (a) Mass media do not have pre-determined functions for all, which means audiences are active and free to receive the messages in their individual environments and capacities. They vary in the use of their senses to perceive and interpret the messages.

75. (a) Correlation is how the media presents facts and viewpoints of various people, interprets and assigns meaning to issues and guides the receivers to evaluate them and thus works to shape their opinions or influence their attitudes. This function is vital for the progress of the society. So, both (A) and (R) are true, and (R) is the correct explanation of (A).

76. (a) Both A and R are true and R is the correct explanation of A.
Media entertainment is usually based on escaping the reality and show cases a word of make believe to It transports us to another world so that we are relieved of our boredom or loneliness; we escape from facing various kinds of fear in life and avoid; and avoid struggling for basic necessities of life and facing daily battles in traffic, work, family demands, We have unprecedented access to all forms of distraction at our fingertips. And the most favoured escape is entertainment.

77. (a) An open house is a scheduled period of time for which a house/organisation is open for exploration by interested people/parties. If a public sector organisation aims to communicate with public by organizing an open house, it will serve as an exercise for publicity(process of creating public awareness about the organisation), public relations (the professional maintenance of a favourable public image by the organization) and image building (improving the public image or opinion about the organisation)
Lobbying, on the other hand, refers to any attempt to influence the decisions of the government. It has its origin in the efforts made to influence the votes of legislators, generally in the lobby outside the legislative chamber; and has come to acquire an unavoidable presence in the political system today.

78. (d) (A)-(iii), (B)-(i), (C)-(ii), (D)-(iv)
Blogging is a discursive or informational post published on the World Wide Web; hence, a part of social media. Television is audio-visual content for audience viewing transmitted through an electronic device (TV set); hence called electronic media. Periodicals are newspapers, magazines, newsletters and scholarly journals published in print at regular intervals; hence called print media. The World wide web is a collection of sites.

79. (a) Social media refers to websites and applications that are designed to allow people to share content quickly, efficiently, and in real-time. Blog is a form of social media; others are social networking sites, social news, media-sharing, etc. So, Assertion (A) as well as Reason (R) is correct.

CHAPTER 18

Types of Reasoning

REASONING (INCLUDING MATHEMATICS)

Reasoning is fundamental to knowing and doing mathematics. In mathematics, reasoning involves drawing logical conclusions based on evidence or stated assumptions. In common language, to reason is to think, understand and form judgements logically or to find a solution to a problem by considering the possible options. Aptitude is a natural ability or propensity to learn. Sense making may be considered as developing understanding of a situation, context or concept by connecting it with existing knowledge or previous experience. Reasoning and sense making are closely interrelated and are the foundation for a solid preparation in mathematics. In this unit, apart from reasoning, we will discuss mathematical aptitude also that has very important in NET Examination.

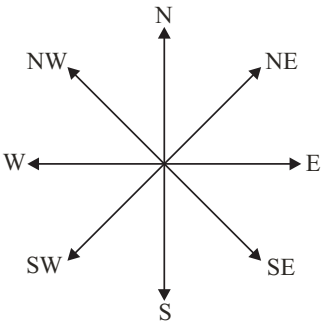
There are two types of Reasoning tests - verbal and Non-verbal. The items in a verbal test are stated in language form such as Analogy test, series test, different class test, etc. Whereas, Non-verbal tests are made up of materials such as patterns, lines, drawings, pictures, paper cutting and the like. Non-verbal tests are also called matrices or abstract reasoning tests.

As far as NET examination pattern is concerned mathematical reasoning covers mainly verbal and basic mathematical skills. Questions on series, analogy, classification, blood relation, direction sense, seating arrangement appear regularly in the exam.

It is also necessary to be familiar with simple, basic mathematical operations such as simplification, percentage, profit, loss and discount, Ratio and proportion, Average, time, speed and distance, time and work, etc.

DIRECTION SENSE TEST

In this part, the questions consist of a sort of direction puzzle and the candidates are required to ascertain the final direction or the distance between the two points. The test is meant to judge the candidate's ability to trace and follow the direction correctly.



The adjoining diagram shows the four main directions (North N, South S, East E, and West W) and the four cardinal directions (North-East NE, North-West NW, South-East SE, and South-West SW). Candidates should memorize the same.

How to solve the problems

The easiest way of solving these problems is to draw a diagram as you read information about the problem and let the diagram reflect all the information given in the problem. To solve these types of problems, the student should know the directions properly without any confusion.

POINTS TO REMEMBER

- At the time of sunrise if a man stands facing the east, his shadow will be towards west, i.e. behind him.
- At the time of sunset the shadow of an object is always to the east.
- If a man stands facing the North, at the time of sunrise his shadow will be towards his left and at the time of sunset it will be towards his right.
- At 12:00 noon, the rays of the sun are vertically downward and hence there will be no shadow.
- The shortest distance from a particular point after travelling a distance of x metres in the horizontal direction and a distance of y metres in the vertical direction is equal to $\sqrt{x^2 + y^2}$.

RANKING & NUMBER TEST, TIME SEQUENCE

The position of a thing/person etc. in a definite order is called as 'Rank'.

In this type of test, relative position or rank of some person or object is given and candidates are required to find the rank or position of other person or object.

Types of Questions

I. Rank of a person in a queue

- Position of person from upward
  = [Total no. of persons – position of person from down] + 1.
- Position of person from downward
  = [Total no. of persons – position of person from up] + 1.
- Position of person from right
  = [Total no. of persons – position of person from left] + 1.
- Position of person from left
  = [Total no. of persons – position of person from right] + 1.

CLOCK & CALENDAR

- The solar year consists of 365 days, 5 hrs 48 minutes, 48 seconds.
  In 47 BC, Julius Caesar arranged a calendar known as the Julian calendar in which a year was taken as days and in order to get rid of the $365\frac{1}{4}$ odd quarter of a day, an extra

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day was added once in every fourth year and this was called as a leap year.

- In an ordinary year,
  1 year = 365 days = 52 weeks + 1 day
  In a leap year,
  1 year = 366 days = 52 weeks + 2 days
  Note : First January 1 A.D. was Monday.
  To find a particular day corresponding to a particular date, the number of odd days upto that date should be computed and if no. of odd days is
  0 odd day stands for Sunday
  1 odd day stands for Monday
  2 odd day stands for Tuesday
  3 odd day stands for Wednesday
  4 odd day stands for Thursday
  5 odd day stands for Friday
  6 odd day stands for Saturday
- A clock has two hands : Hour hand and Minute hand.The minute hand (M.H.) is also called the long hand and the hour hand (H.H.) is also called the short hand.
- The clock has 12 hours numbered from 1 to 12.
  Also, the clock is divided into 60 equal minute divisions. Therefore, each hour number is separated by five minute divisions. Therefore,
- Two One minute divisions = $\frac{360}{60}$ = 6° apart i.e. in one minute, the minute hand moves 6°.
- Two One hour divisions = 6° × 5 = 30° apart i.e. in one hour, the hour hand moves 30°.
  Also, in one minute, the hour hand moves = $\frac{30^\circ}{60^\circ} = \frac{1^\circ}{2}$.
- Since in one minute, the minute hand moves 6° and hour hand moves $\frac{1^\circ}{2}$, therefore, in one minute, the minute hand gains $5\frac{1^\circ}{2}$ over the hour hand.
- In one hour, the minute hand gains $5\frac{1^\circ}{2} \times 60 = 330^\circ$ over the hour hand i.e. the minute hand gains 55 minute divisions over the hour hand.
- The position of the M.H. relative to the H.H. is said to be the same, whenever the M.H. is separated from the H.H. by the same number of minute divisions and is on the same side (clockwise or anticlockwise) of the H.H. Any relative position of the hands of a clock is repeated 11 times in every 12 hours.
- When both hands are 15 minute spaces apart, they are at a right angle.
  When they are 30 minute spaces apart, they point in opposite directions.
  The hands are in the same straight line when they are coincident or opposite to each other.
- In every hour, both the hands coincide once.
  – In a day, the hands are coinciding 22 times.
  – In every 12 hours, the hands of a clock coincide 11 times.
  – In every 12 hours, the hands of a clock are in opposite direction 11 times.
  – In every 12 hours, the hands of clock are at right angles 22 times.
  – In every hour, the two hands are at right angles 2 times.
  – In every hour, the two hands are in opposite directions once.
  – In a day, the two hands are at right angles 44 times.
- If both the hands coincide, then they will again coincide after $65\frac{5}{11}$ minutes. i.e. in a correct clock, both hands coincide at an interval of $65\frac{5}{11}$ minutes.
- If the two hands coincide in time less than $65\frac{5}{11}$ minutes, then the clock is running too fast and if the two hands coincide in time more than $65\frac{5}{11}$ minutes, then the clock is running too slowly.
- If a clock indicates 6 : 10, when the correct time is 6 : 00, it is said to be 10 minutes too fast and if it indicates 5 : 50 when the correct time is 6 : 00, it is said to be 10 minutes too slow.
- Also, if both hands coincide at an interval of x minutes and $x < 65\frac{5}{11}$, then total time gained $= \left(\frac{65\frac{5}{11} - x}{x}\right)$ minutes and clock is said to be 'fast'.
- If both hands coincide at an interval of x minutes and $x > 65\frac{5}{11}$, then total time lost $= \left(\frac{x - 65\frac{5}{11}}{x}\right)$ minutes and clock is said to be 'slow'.

SITTING ARRANGEMENT & PUZZLE

In this section, generally the questions are asked from Ordering or Ranking, Scheduling, Scattering or Distributing. In these types of questions, we have to analyse the given information and condense it in a suitable form to answer the questions. Though there exists no set formulae to solve these kinds of problems, yet a systematic approach can help to solve questions.

As far as possible, it should be tried to tabulate the data, as it helps us to condense the information and reach to conclusions.

MATHEMATICAL OPERATION AND ARITHMETICAL REASONING

MATHEMATICAL OPERATION

In such type of questions some relationships are shown with the help of certain symbols/notations and/or mathematical signs. Each symbol or sign is defined clearly in the question statement itself and we have to solve the questions accordingly.

For example,

Suppose the triangle (Δ) means addition.

We know that triangle is a plane figure but here it has been assigned the value of addition (+). Thus.

$$3 \Delta 5 \Rightarrow 3 + 5 = 8$$

To work out such questions substitute the assigned/implied meanings of the symbol or sign and proceed accordingly. Do not consider its real meaning and follow the BODMAS rule.

MATHEMATICAL STATEMENTS

Mathematical Statements are the combination of mathematical signs, symbols, or letters which are based on certain mathematical rules.

For example :

'P < Q' means 'P is smaller than Q'.

'P ≤ Q' means 'P is either smaller than or equal to Q'.

'P > Q' means 'P is greater than Q'.

'P ≥ Q' means 'P is either greater than or equal to Q'.

'P = Q' means 'P is equal to Q'.

Conclusions: conclusion is the last main division of a discourse, usually containing a summing up of the points of given statement.

For example :

A > B, C > A

Conclusions:

I. C > B

II. C = B

After combining the above statements, we find that C > A > B

Here C is greater than both of A and B but C is not equal to B. Hence conclusion II is incorrect.

EXERCISE

1. A bag contains an equal number of one rupee, 50 paise and 25 paise coins. If the total amount in the bag is ₹ 35, how many coins of each type are there ? **[December-2004]**

(a) 15 (b) 18

(c) 20 (d) 25

2. My wrist watch becomes 30 minutes slow in a day. If on a particular day it is showing the correct time at 6 o'clock in the morning, what time will it show at 10 o'clock in the evening on that very day? **[June-2005]**

(a) 10.22 pm (b) 10.15 pm

(c) 10.30 pm (d) None of the choices

3. At what time between 5.30 and 6.00 will the hands of an clock be at right angles ? **[December-2005]**

(a) $43\frac{5}{11}$ min. past 5 (b) $43\frac{7}{11}$ min. past 5

(c) 40 min. past 5 (d) 45 min past 5

4. January 1, 1995 was Sunday. What day of the week lies on January 1, 1996 ? **[December-2005]**

(a) Sunday (b) Monday

(c) Saturday (d) None of these

5. At what time between 4 and 5 O'clock will the hands of a watch point in opposite directions? **[June-2006]**

(a) 45 min. past 4 (b) 40 min. past 4

(c) 50 4/11 min. past 4 (d) 54 6/11 min. past 4

6. Monday falls on 20th March 1995. What was the day on 3rd November 1994? **[June-2006]**

(a) Thursday (b) Sunday

(c) Tuesday (d) Saturday

7. How many Mondays are there in a particular month of a particular year, if the month ends on Wednesday? **[June-2007]**

(a) 5 (b) 4

(c) 3 (d) None of the above

8. January 12, 1980 was Saturday, what day was January 12, 1979: **[June-2007]**

(a) Saturday (b) Friday

(c) Sunday (d) Thursday

9. At what time between 3 and 4 O'clock will the hands of a watch point in opposite directions? **[December-2007]**

(a) 40 minutes past three (b) 45 minutes past three

(c) 50 minutes past three (d) 55 minutes past three

10. If January 1st, 2007 is Monday, what was the day on 1st January 1995? **[June-2008]**

(a) Sunday (b) Monday

(c) Friday (d) Saturday

11. There are five books A, B, C, D and E. The book C lies above D, the book E is below A and B is below E. Which is at the bottom? **[December-2008]**

(a) E (b) B

(c) A (d) C

12. On what dates of April 1994 did SUNDAY fall? **[December-2008]**

(a) 2, 9, 16, 23, 30 (b) 3, 10, 17, 24

(c) 4, 11, 18, 25 (d) 1, 8, 15, 22, 29

13. Two ladies and two men are playing bridge and seated at North, East, South and West of a table. No lady is facing East. Persons sitting opposite to each other are not of the same sex. One man is facing South. Which direction are the ladies facing to? **[June-2009]**

(a) East and West (b) North and West

(c) South and East (d) None of these

14. What was the day of the week on 1st January 2001 ? **[June-2009]**

(a) Friday (b) Tuesday

(c) Sunday (d) Wednesday

15. There are 10 true-false questions in an examination. Then these questions can be answered in **[December-2009]**
(a) 20 ways (b) 100 ways
(c) 240 ways (d) 1024 ways

16. January 1, 1995 was a Sunday. What day of the week lies on January 1, 1996 ? **[December-2009]**
(a) Sunday (b) Monday
(c) Wednesday (d) Saturday

17. On January 12, 1980, it was a Saturday. The day of the week on January 12, 1979 was **[June-2010]**
(a) Thursday (b) Friday
(c) Saturday (d) Sunday

18. Mr. A, Miss B, Mr. C and Miss D are sitting around a table and discussing their trades. **[December-2010]**
(i) Mr. A sits opposite to the cook.
(ii) Miss B sits right to the barber
(iii) The washerman sits right to the barber
(iv) Miss D sits opposite to Mr. C
What are the trades of A and B ?
(a) Tailor and barber (b) Barber and cook
(c) Tailor and cook (d) Tailor and washerman

19. What is the smallest number of ducks that could swim in this formation – two ducks in front of a duck, two ducks behind a duck and a duck between two ducks ? **[December-2010]**
(a) 5 (b) 7 (c) 4 (d) 3

20. How many 8's are there in the following sequence which are preceded by 5 but not immediately followed by 3 ?
5 8 3 7 5 8 6 3 8 5 4 5 8 4 7 6 **[June-2011]**
5 5 8 3 5 8 7 5 8 2 8 5
(a) 4 (b) 5 (c) 7 (d) 3

21. If Ram knows that y is an integer greater than 2 and less than 7 and Hari knows that y is an integer greater than 5 and less than 10, then they may correctly conclude that **[June-2012]**
(a) y can be exactly determined
(b) y may be either of two values
(c) y may be any of three values
(d) there is no value of y satisfying these conditions

22. Let a means minus (–), b means multiplied by (×), C means divided by (÷) and D means plus (+). The value of (90 D 9 a 29) C 10 b 2 is **[December-2012]**
(a) 8 (b) 10 (c) 12 (d) 14

23. A, B, C, D, E and F are sitting around a round table. A is between E and F. E is opposite to D and C is not in either of the neighbouring seats of E. The person opposite to B is **[September-2013]**
(a) C (b) D (c) A (d) F

24. Starting from point A, Ajit walks 14 metres towards west, he then turns to his right and walks 14 metres and then turns to his left and walks 10 metres. He again turns to his left and walks 14 metres and reaches to the point E. The shortest distance between A and E is **[September-2013]**
(a) 38 (b) 42 (c) 52 (d) 24

25. A person writes all the numbers from 0 to 99. The number of times digit 3 will be written is **[September-2013]**
(a) 18 (b) 19 (c) 20 (d) 21

26. In this series
6, 4, 1, 2, 2, 8, 7, 4, 2, 1, 5, 3, 8, 6, 2, 2, 7, 1, 4, 1, 3, 5, 8, 6, how many pairs of successive numbers have a difference of 2 each ? **[December-2013]**
(a) 4 (b) 5 (c) 7 (d) 8

27. One writes all numbers from 50 to 99 without the digits 2 and 7. How many numbers have been written? **[June-2014]**
(a) 32 (b) 36 (c) 40 (d) 38

28. A man started walking from his house towards south. After walking 6 km, he turned to his left and walked 5 km. Then he walked further 3 km after turning left. He then turned to his left and continued his walk for 9 km. How far is he away from his house? **[June-2014]**
(a) 3 km (b) 4 km (c) 5 km (d) 6 km

29. One day Prakash left home and walked 10 km towards south, turned right and walked 5 km, turned right and walked 10 km and turned left and walked 10 km. How many km will he have to walk to reach his home straight? **[June-2015]**
(a) 10 (b) 20 (c) 15 (d) 30

30. Anil after travelling 6 km towards East from his house realized that he has travelled in a wrong direction. He turned and travelled 12 km towards West, turned right and travelled 8 km to reach his office. The straight distance of the office from his house is : **[December-2015]**
(a) 20 km (b) 14 km (c) 12 km (d) 10 km

31. A person walks 10 m infront and 10 m to the right. Then every time turning to his left, he walks 5,15 and 15 m respectively. How far is he now from his starting point ? **[July-2016]**
(a) 20 m (b) 15 m (c) 10 m (d) 5 m

32. A postman walked 20 m straight from his office, turned right and walked 10 m. After turning left he walked 10 m and after turning right walked 20 m. He again turned right and walked 70 m. How far he is from his office ? **[November-2017]**
(a) 50 m. (b) 40 m. (c) 60 m. (d) 20 m.

33. Six friends A, B, C, D, E and F are sitting in a closed circle facing the center. E is to the left of D. C is between A and B. F is between E and A. Who is to the right of C? **[20th June 2019-Ist Shift]**
(a) A (b) B (c) D (d) E

34. The sixth number in a sequence of numbers is 32 and each number after the first number in the sequence is 4 less than the number immediately proceeding it. What is the third number in the sequence? **[21st June 2019-IInd Shift]**
(a) 36 (b) 40 (c) 44 (d) 48

35. In a school, there are five teachers. A and B both are teaching Hindi and English. C and B both are teaching English and Geography. D and A both are teaching Punjabi and Hindi. E and B both are teaching History and French.

Who among the teachers is teaching maximum number of subjects? **[21st June 2019-IInd Shift]**

(a) A (b) B (c) D (d) C and E

36. Among the five friends, Vineet is taller than Monika, but not as tall as Ram. Jacob is taller than Dalip but shorter than Monika. Who is the tallest in their group?

[24th June 2019-IInd Shift]

(a) Ram (b) Monika (c) Vineet (d) Jacob

37. In a class of 35 students, Rajan is placed seventh from the bottom where as karan is placed ninth from the top. Divya is placed exactly in between the two. What is the differences in the positions of Rajan and Divya?

[26th June 2019-IInd Shift]

(a) 9 (b) 10 (c) 11 (d) 13

38. if 'a' is inversely proportional to 'b' and 'b' is inversely proportional to 'c' then **[2nd Dec. 2019-Ist Shift]**

(a) 'a' is inversely proportional to 'c'

(b) 'a' is directly proportional to 'b'

(c) 'a' is constant

(d) 'a' is directly proportional to 'bc'

HINTS & EXPLANATION

1. (c) Let the number of coins = x

$x + 0.5\,x + 0.25\,x = 35$

$1.75x = 35$

$x = \dfrac{35}{1.75} = 20$

2. (d) Because the wrist watch becomes 30 minutes slow in a day. So it will show 9.30 p.m. on the next day in place of 10 o'clock.

3. (b) At 5 'O' Clock, the hands are 25 minute space a past. To be at right angles and that to between 5.30 and 6, one minute hand has to gain (25 + 15) = 40 minute spaces.

55 minute spaces are gained in 60 minute.

40 minute spaces are gained in

$\left(\dfrac{60}{55} \times 40\right)$ min = $43\ \dfrac{7}{11}$ minutes

$\therefore$ Required time = $43\ \dfrac{7}{11}$ minutes past 5.

4. (b) $\because$ 1st January 1995 $\rightarrow$ Sunday

$\therefore$ 31st December 1995 $\rightarrow$ Sunday

($\because$ 1995 was not a leap year)

$\therefore$ 1st January 1996 = Monday

5. (d) At 4 O' clock the hands of the watch are 20 minute space a part. To be in opposite direction, they must be 30 minute space past. Minute hand will have to gain 50 minute spaces.

55 minute spaces are gained in 50 minute.

$\therefore$ 50 minute spaces are gained in

$= \dfrac{60}{55} \times 50 = 54\dfrac{6}{11}$ minute

$\therefore$ Required time = $54\dfrac{6}{11}$ minute past 4

6. (a) Number of total days between 3 November 1994 to 20 March 1995 = 27 + 31 + 31 + 28 + 20

= 137

Odd days = Remainder $\left(\dfrac{137}{7}\right)$ = 4 Day

Day on 3 November 1994 = Monday – 4 = Thursday

7. (a) If a month ends on Wednesday, the that month have five Mondays (Except Month of February)

8. (b) Odd days between 12 January 1979 to 12 January 1980

Remainder $\left(\dfrac{365}{7}\right)$ = 1 day

$\therefore$ Day on 12 January 1979 = Saturday – 1

= Friday.

9. (c) At 3'O Clock the minutes hand will be 15 minute away from hours hand.

Both hands are opposite when they are 30 minutes away from each other.

So, minute hand has to gain 45 minutes.

Minute hand take 60 minutes to gain 55 minutes.

Time taken to gain 1 minute = $\dfrac{60}{55} = \dfrac{12}{11}$

Time take by minute hand to gain 45 minutes.

$= \dfrac{12}{11} \times 45 = 49\dfrac{1}{11} \simeq 50$ minutes

Required Time = 50 minutes Past three.

10. (a) Total number of odd days from

1 January 1995 to 31 December 2006

= 1 + 2 + 3 + 2 + 3 + 2 + 2

= 15 odd days

= 1 odd day

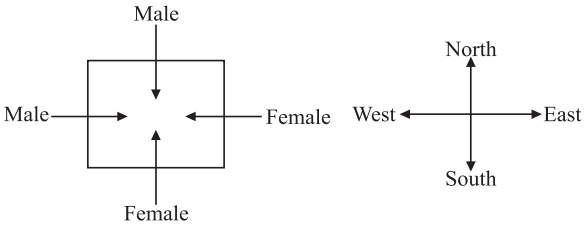
Day on 1 January 1995 = Monday – 1

= Sunday

11. (b) ... Book C lies above D — C
⇒ Book A lies above E — D
⇒ Book E lies above B — or — A
∴ Book at the bottom = B — E
[... No book lies below B] — B

12. (b) To find the week day on 2nd April, 1994, calculate odd days
[... After 1900, No. of full year = 93]
$x = 93$
[... There are 23 leap years between 1900 and 1994]
y = 23
[... 1900 = (multiple years of 400) + 300]
z = 1
[Jan. 31 + Feb. 28 + March 31 + April 2]
No. of days = 92
$x + y + z = 209$
Total = 209
On dividing 209 by 7, remainder = 6
∴ 2nd April, 1994, Sixth day after Sunday = Saturday
Hence, in April 1994 Sunday fall on 3, 10, 17, 24 dates.

13. (b)



14. (*) 2000 years contains O odd day
1 January 2001 has one odd day
So that day will be Monday.

15. (d) Require number of ways = $2^{10} = 1024$ ways.

16. (b) Odd Days between 1 January, 1995 and 1 January, 1996 = 1 Day
∴ Day on 1 January, 1996 = Sunday + 1
= Monday

17. (b) Odd days between 12 January 1979 and 12 January 1980 = 1 odd Day
∴ Day on 12 January 1979 = Saturday – 1 = Friday.

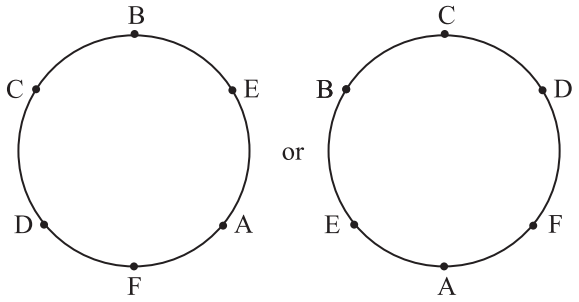
18. (c) **19. (d)**

20. (a) There are four 8's in the sequence which are preceded by 5 but not immeditely followed by 3.

21. (a) According Ram's Statement
$y - 2 \rightarrow 7 \quad \Rightarrow 2 < y < 7$
According Hari's Statement
$y - 5 \rightarrow 7 \quad \Rightarrow 5 < y < 7$
Integer
By taking both the statement only no. 6 is possible.
Hence, y can be exactly determined.

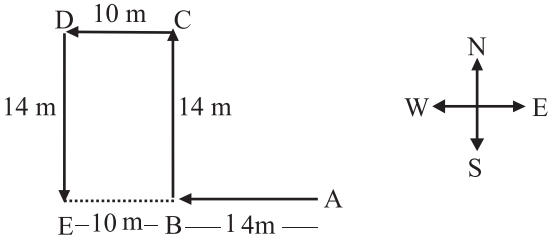
22. (d) $(90 + 9 - 29) \div 10 \times 2$
$= (99 - 29) \div 10 \times 2$
$= 70 \div 10 \times 2$
$= 7 \times 2 = 14$

23. (d)



Hence, 'F' is sitting in front of 'B'.

24. (d)



Required distance, AE = (10 + 14) m = 24 m

25. (b) Numbers which contains digit 3–
3, 13, 23, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 43, 53, 63, 73, 83, 93.
So digit 3 will be written 19 times.

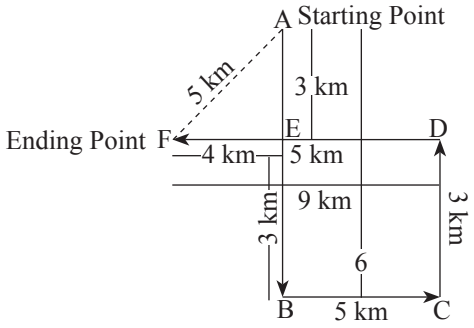
26. (c) 6, 4, 1, 2, 2, 8, 7, 4, 2, 1, 5, 3, 8, 6, 2, 2, 7, 1, 4, 1, 3, 5, 8, 6
Hence such pairs of no. is 7 that difference is **2.**

27. (a)

50	51	(52)	53	54	55	56	(57)	58	59
60	61	(62)	63	64	65	66	(67)	68	69
(70)	(71)	(72)	(73)	(74)	(75)	(76)	(77)	(78)	(79)
80	81	(82)	83	84	85	86	(87)	88	89
90	91	(92)	93	94	95	96	(97)	98	99

∴ 50 – 18 = 32
He has written 32 numbers.

28. (c)



BC = DE = 5 km
And DF = 9 km
∴ EF = DF – DE
⇒ EF = 9 – 5 = 4 km
Again AB = 6 km
And CD = BE = 3 km
∴ AE = AB – BE
= 6 – 3 = 3 km

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Now in Δ AEF, $AF = \sqrt{(EF)^2 + (AE)^2}$

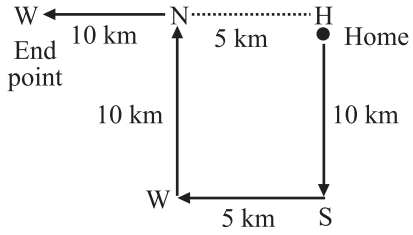
$= \sqrt{(4)^2 + (3)^2}$

$= \sqrt{16+9}$

$= \sqrt{25}$

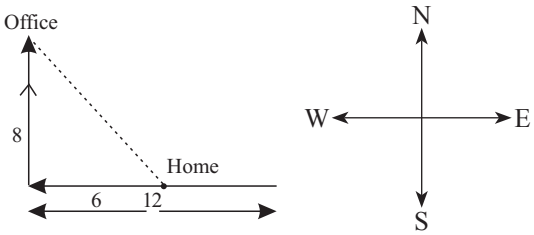
$= 5$ km

29. (c)



He has to walk 15 km to reach his home straight.

30. (d)

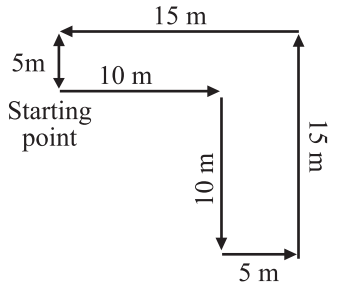


Straight distance $= \sqrt{8^2 + 6^2}$

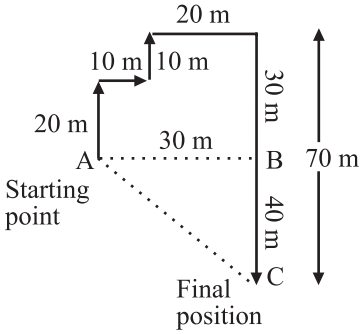
$= \sqrt{100}$

$= 10$ km.

31. (d)



32. (a)



∴ Distance of final position of postman and his office is, AC.

∴ $(AC)^2 = (AB)^2 + (BC)^2$

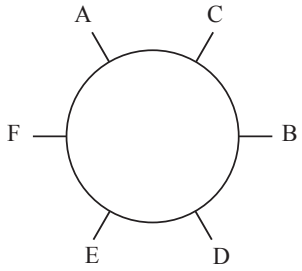
$AC^2 = (30)^2 + (40)^2$

$AC^2 = 900 + 1600$

$AC = \sqrt{2500}$

AC = 50 metre

33. (a) Sitting arrangement of six friends in a circle is like this:



Right of 'C' is 'A'.

34. (c) Sixth number = 32

Fifth number = 32 + 4 = 36

Fourth number = 36 + 4 = 40

Third number = 40 + 4 = 44

35. (b)

Subjects	Teacher				
	A	B	C	D	E
Hindi	✓	✓		✓	
English	✓	✓	✓		
Geography		✓	✓		
Punjabi	✓			✓	
History		✓			✓
French		✓			✓

Hence, B teaches 5 subjects, that is maximum number of subjects teaches by any teacher.

36. (a) Arrangement of five friends in ascending order of their height.

Dalip < Jacob < Monika < Vineet < Ram (Tallest)

Hence, Ram is tallest among them.

37. (b) Rajan's rank from top = 35 – 7 + 1 = 29th. Divya's placed exactly between Karan and Rajan.

Exactly middle place = 29 – 9 – 1 = 19th place so, Divya's Rank is 19th from top.

Now, difference in Rajan's Rank and Divya's Rank = 29 – 19 = 10

38. (b) From equation

$a \propto \frac{1}{b}$

$\Rightarrow a = \frac{K_1}{b}$ ...(i)

and $b \propto \frac{1}{C}$

$\Rightarrow b = \frac{K_2}{C}$ ...(ii)

from (i) and (ii), we have

$a = \frac{K_1}{\frac{K_2}{C}} \Rightarrow a = \frac{K_1 C}{K_2} \Rightarrow a \propto C$

Hence, option (b) is correct.

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CHAPTER 19

Numerical Series, Letter Series, Codes and Relationship

NUMERICAL SERIES

Number Series tests are a type of numerical aptitude test which require you to find the missing or wrong number in a sequence. This missing or wrong number may be at the beginning or middle or at the end of sequence.

The only thing to understand for solving these questions is the pattern on which a number series is written. A number series can be framed by using various methods. Therefore, it is advisable for the students to practice as many questions as possible.

ALPHABET SERIES

There are 26 alphabets in the english alphabet series. If the alphabets are asked to be counted from the left side, we start counting from the letter A, and when asked to count from right we count from Z.

A	B	C	D	E	F	G	H	I
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
J	K	L	M	N	O	P	Q	R
(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
S	T	U	V	W	X	Y	Z	
(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26).	

1. Keep the order of letters with their respective numbers i.e. A = 1, ... Z = 26 and vice-versa i.e. Z = 1 .... A = 26.
2. When the counting is circular, after Z, the cycle will continue from A.
3. Sometimes letters are omitted in sequence e.g., ABCD, FGH, here E and I in the sequence are omitted.
4. Sometimes, equal number of letters are omitted e.g. in BEH, two consecutive letters are omitted.
5. One following the letter and other preceding it may be interchanged, e.g., in BCD, D follows C and B precedes C.
6. Sometimes, numbers are mixed with letters, the number may refer to the position of the letters in the alphabet.
7. Sometimes, there may be repetition of letters in a set order e.g. in abcc, bcdd, one letter is repeated twice, the next set could be cdee.

CODING & DECODING

A code is a method of sending a secret message between two parties that cannot be deciphered by a third party. However Coding is done according to a certain pattern in the mind of the sender. Therefore, its meaning can be deciphered by a third person, only if he carefully studies this pattern. This process is called 'Decoding'. You will be required to find a word by analysing the given code or forming the code for a new word.

Following are the general patterns for coding - Decoding-

(i) Words could be written in reverse order.

(ii) ±1, ±2, ±3.....should be considered while decoding.
So +1, means that B would be written in place of A and so on, –1 means A would be written in place of B and so on.

(iii) Sometimes, a successive increasing or decreasing pattern can also be followed, i.e., first alphabet would be replaced by +1,
Second alphabet by +2 and so on.

(iv) Oscillation pattern can also be followed, i.e. first alphabet would be replaced by +1, second alphabet would be replaced by –1 and so on.

(v) Also, sometime the given code contains all the alphabets for the one given in question. In such a situation corresponding codes should be replaced to curive at the answer.

ANALOGY

Analogy literally means 'similarity' or having similar features. Questions on analogy test the ability of a candidate to understand the relationship between two given objects or words or numbers that are asked in the question. These type of questions cover all types of relationships that one can think of, there are many ways of establishing a relationship.

CLASSIFICATION

Classification is a process of grouping various objects on the basis of their common properties. Classification, therefore, helps to make a homogeneous group from heterogeneous items. Questions on classification can be asked in any of the following form.

BLOOD RELATION

Questions based on blood relationships are very common. In these type of questions, a roundabout description is given in the form of certain small relationships and direct relationship between the persons concerned is to be deciphered.

Questions based on Blood Relation may appear confusing but easier to answer if we break the questions into parts and analyze it with the help of a diagram.

Representation of one generation to the next

1st generation	Grandfather, Grandmother
2nd generation	Mother, Father, Uncle, Aunty
3rd generation	Self, Sister, Brother & Brother/Sister-in-law
4th generation	Son, Daughter, Nephew, Niece

POINTS TO REMEMBER	
Memorable facts about blood relations	
My mother's or father's son	my Brother.
My mother's or father's daughter	my Sister.
My mother's or father's father	my Grandfather.
My mother's or father's sister	my Aunt.
My mother's or father's brother	my Uncle.
My son's wife	my daughter-in-law.
My daughter's husband	my Son-in-law.
My brother's son	my Nephew.
My brother's daughter	my Niece.
My sister's husband	my brother-in-law.
My brother's wife	my Sister-in-law.
My husband's or wife's sister	my Sister-in-law.
My husband's or wife's brother	my Brother-in-law.
My uncle's or aunt's son or daughter	my Cousin.
My wife's father or husband's father	my Father-in-law.
My wife's mother or husband's mother	my Mother-in-law.
My father's wife	my Mother.
My mother's husband	my Father.
My son's or daughter's son	my Grandson.
My son's or daughter's daughter	my Granddaughter.

VENN DIAGRAM

The best method of solving the problems based on inference or deduction is Venn diagram.

Venn diagram is a way representing sets pictorially.

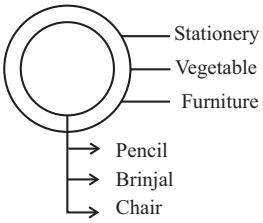
Various cases of Venn diagram

Case I :

An object is called a subset of another object, if the former is a part of the latter and such relation is shown by two concentric circles.

(i) Pencil, Stationery
(ii) Brinjal, Vegetable
(iii) Chair, Furniture

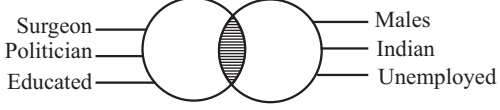
It is very clear from the above relationship that one object is a part of the other, and hence all such relationships can be represented by the figure shown.



Case II :

An object is said to have an intersection with another object that share some things in common.

(i) Surgeon, Males
(ii) Politicians, Indian
(iii) Educated, Unemployed

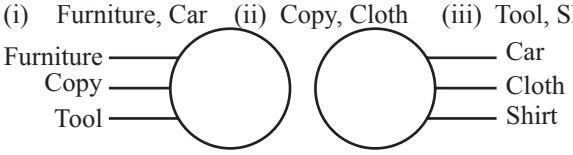


All the three relationships given above have something in common as some surgeons can be male and some female, some politicians may be Indian and some may belong to other countries, educated may be employed and unemployed as well and all the three relationships can be represented by the figure shown.

Case III :

Two objects are said to be disjoint when neither one is subset of another and nor do they share anything in common. In other words, totally unrelated objects fall under this type of relationship.

(i) Furniture, Car (ii) Copy, Cloth (iii) Tool, Shirt



It is clear from the above relationships that both the objects are unrelated to each other, and hence can be represented diagrammatically as shown in figure above.

From the above discussion we observe that representation of the relationship between two objects is not typical if students follow the above points. But representation of three objects diagrammatically pose slight problems before the students.

ANALYTICAL METHOD

Try to understand these type of questions using analytical method.

A statement always has a subject and a predicate :

All politicians are liars.
(subject) (predicate)

Basically, there are four types of sentences.

A - type ⇒ All politicians are liars.
I-type ⇒ Some politicians are liars
O-type ⇒ Some politicians are not liars
E-type ⇒ No politicians are liars

Conclusions can be drawn by taking two of the above statements together. The rules of conclusion are :

A + A = A A + E = E I + A = I
I + E = O E + A = O* E + I = O*

Conclusion can only be drawn from the two statements if the predicate of the first statement is the subject of the second statement. The common term disappears in the conclusion and it consists of subject of the first statement and predicate of the second statement. For examples

A + A = A
(i) All boys are girls.
(ii) All girls are healthy

Conclusion : All boys are healthy.

A + E = E
(i) All boys are girls.
(ii) No girls are healthy

Conclusion : No boys are healthy.

I + A = I
(i) Some boys are girls.
(ii) All girls are healthy

Conclusion : Some boys are healthy.

I + E = O

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(i) Some boys are girls.
(ii) No girls are healthy
Conclusion : Some boys are not healthy.
E + A = O*
(i) No boys are girls.
(ii) All girls are healthy
Conclusion : Some healthy are not boys.
I + I = O*
(i) No boys are girls.
(ii) Some girls are healthy
Conclusion : Some healthy are not boys.

EXERCISE

1. If the BLOOD is coded as 24113 and BRUST as 20678, then code for ROBUST is : **[December-2004]**
(a) 620781 (b) 012678
(c) 678102 (d) 610732

2. The letters in the first set have certain relationships. On the basis of the relationship which is the right choice for the second set ? **[December-2004]**
BF : GK : : LP : ?
(a) JK (b) QU
(c) VW (d) RQ

3. If in a certain code language. BLOOD is written as 24113 and BURST is written as 20678 then how will ROBUST be written in that code language? **[June-2005]**
(a) 612078 (b) 610287
(c) 342058 (d) 620261

4. In a certain code, ROUNDS is written as RONUDS. How will PLEASE will be written in the same code: **[December-2005]**
(a) LPAESE (b) PLAESE
(c) LPAEES (d) PL A SEE

5. Insert the missing number : **[December-2005]**
8 24 12 ? 18, 54
(a) 26 (b) 24
(c) 36 (d) 32

6. In a certain code, FHQK means GIRL. How will WOMEN be written in the same code? **[June-2006]**
(a) VNLDM (b) FHQKN
(c) XPNFO (d) VLNDM

7. Insert the missing number: **[June-2006]**
16/32, 15 /33, 17/31, 14/34?
(a) 19/35 (b) 19/30
(c) 18/35 (d) 18/30

8. In a certain code, PAN is written as 31 and PAR as 35. In this code PAT is written as: **[December-2006]**
(a) 30 (b) 37
(c) 38 (d) 39

9. The letters in the first set have certain relationship. On the basis of this relationship, what is the right choice for the second set? **[December-2006]**
AST : BRU : : NQV : ?
(a) ORW (b) MPU
(c) MRW (d) OPW

10. If A stands for 5, B for 6, C for 7, D for 8 and so on, then the following numbers stand for 17, 19, 20, 9 and 8: **[December-2006]**
(a) PLANE (b) MOPED
(c) MOTOR (d) TONGA

11. In the sequence of numbers 8, 24, 12, X, 18, 54 the missing number X is: **[December-2006]**
(a) 26 (b) 24
(c) 36 (d) 32

12. 'A' is the father of 'C, and 'D' is the son of 'B'. 'E' is the brother of 'A'. If 'C is the sister of 'D', how is 'B' related to 'E'? **[June-2007]**
(a) daughter (b) husband
(c) sister-in-law (d) brother-in-law

13. If in a certain language TRIVANDRUM is coded as 2 5 9 5 3 5 4 7 5 8, how would MUDIT be coded? **[June-2007]**
(a) 83453 (b) 85492
(c) 83453 (d) 83453

14. Which is the number that comes next in the sequence?
9, 8, 8, 8, 7, 8, 6, **[June-2007]**
(a) 5 (b) 6
(c) 8 (d) 4

15. Insert the missing number: **[December-2007]**
36/62, 39/63, 43/61, 48/64, ?
(a) 51/65 (b) 56/60
(c) 54/65 (d) 33/60

16. Choose the number which is different from others in the group: **[December-2007]**
(a) 49 (b) 63
(c) 77 (d) 81

17. Choose the odd word: **[December-2007]**
(a) Nun (b) Knight
(c) Monk (d) Priest

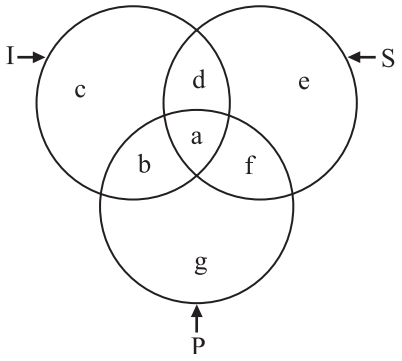
18. Insert the missing number: 4 : 17 : : 7 : ? **[December-2007]**
(a) 48 (b) 49
(c) 50 (d) 51

19. Which number is missing in the following series? **[December-2007]**

2, 5, 10, 17, 26, 37, 50, ?

(a) 63 (b) 65
(c) 67 (d) 69

DIRECTIONS (Qs. 20-22): These questions are based on the following diagram in which there are three interlocking circles I, S and P, where circle I stands for Indians, circle S for Scientists and circle P for Politicians. Different regions in the figure are lettered from a to f.



20. The region which represents Non-Indian Scientists who are Politicians: **[December-2007]**

(a) f (b) d
(c) a (d) c

21. The region which represents Indians who are neither Scientists nor Politicians: **[December-2007]**

(a) g (b) c
(c) f (d) a

22. The region which represents Politicians who are Indians as well as Scientists: **[December-2007]**

(a) b (b) c
(c) a (d) d

23. Find out the number which should come at the place of question mark which will complete the following series: 4, 9, 17, 35, ?, 139 **[December-2007]**

(a) 149 (b) 79
(c) 49 (d) 69

24. Insert the missing number in the following series:

4 16 8 64 ? 256 **[June-2008]**

(a) 16 (b) 24
(c) 32 (d) 20

25. AGARTALA is written in code as 14168171, the code for AGRA is: **[June-2008]**

(a) 1641 (b) 1416
(c) 1441 (d) 1461

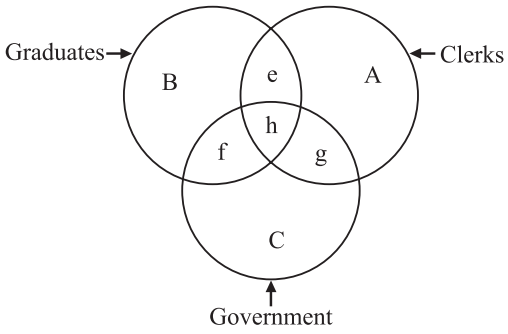
26. What will be the next letter in the following series?

DCXW, FEVU, HGTS **[June-2008]**

(a) AKPO (b) JBYZ
(c) JIRQ (d) LMRS

DIRECTIONS (Qs. 27-29): Study the following Venn diagram and answer questions.

Three circles representing GRADUATES, CLERKS and GOVERNMENT EMPLOYEES are intersecting. The intersections are marked A, B, C, e, f, g and h. Which part best represents the statements in questions 27 to 29?



27. Some Graduates are Government employees but not as Clerks. **[December-2008]**

(a) h (b) g
(c) f (d) e

28. Clerks who are graduates as well as government employees: **[December-2008]**

(a) e (b) f
(c) g (d) h

29. Some graduates are Clerks but not Government employees. **[December-2008]**

(a) f (b) g
(c) h (d) e

30. Find out the wrong number in the sequence:

125, 127, 130, 135, 142, 153, 165 **[December-2008]**

(a) 130 (b) 142
(c) 153 (d) 165

31. The letters in the first set have a certain relationship. On the basis of this relationship mark the right choice for the second set: **[December-2008]**

AST : BRU : : NQV : ?

(a) ORW (b) MPU
(c) MRW (d) OPW

32. In a certain code, GAMESMAN is written as AGMEMSAN. How would DISCLOSE be written in that code? **[December-2008]**

(a) IDSCOLSE (b) IDCSOLES
(c) IDSCOLES (d) IDSCLOSE

33. Insert the missing number in the following:

2/3, 4/7, ? , 11/21, 16/31 **[December-2008]**

(a) 10/8 (b) 6/10
(c) 5/10 (d) 7/13

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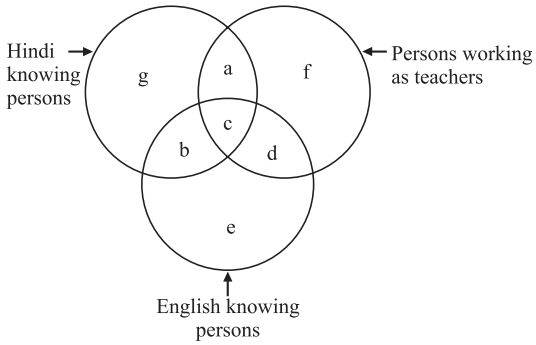
DIRECTIONS (Qs. 34-35): are based on the following venn diagram in which there are three intersecting circles representing Hindi knowing persons, English knowing persons and persons who are working as teachers. Different regions so obtained in the figure are marked as a, b, c, d, e, f and g.



34. If you want to select Hindi and English knowing teachers, which of the following is to be selected? **[June-2009]**

(a) g (b) b
(c) c (d) e

35. If you want to select persons, who do not know English and are not teachers, which of the region is to be selected? **[June-2009]**

(a) e (b) g
(c) b (d) a

36. Find out the wrong number in the sequence. 52, 51, 48, 43, 34, 27, 16 **[June-2009]**

(a) 27 (b) 34
(c) 43 (d) 48

37. The letters in the first set have a certain relationship. On the basis of this relationship mark the right choice for the second set: BDFH : OMKI : : GHIK : ? **[June-2009]**

(a) FHJL (b) RPNL
(c) LNPR (d) JIHF

38. In a certain code, CLOCK is written as KCOLC. How would STEPS be written in that code ? **[June-2009]**

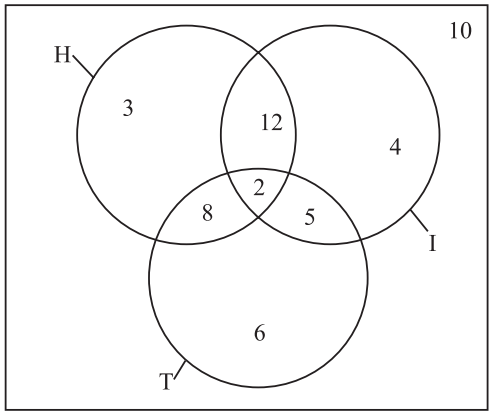
(a) SPEST (b) SPSET
(c) SPETS (d) SEPTS

39. Insert the missing number in the following : **[June-2009]**

3, 8, 18, 23, 33, ?, 48

(a) 37 (b) 40
(c) 38 (d) 45

DIRECTIONS (Qs. 40-41): are based on the following diagram in which there are three intersecting circles. H representing The Hindu, I representing Indian Express and T representing The Times of India. A total of 50 persons were surveyed and the number in the Venn diagram indicates the number of persons reading the newspapers.



40. How many persons would be reading at least two newspapers? **[December-2009]**

(a) 23 (b) 25
(c) 27 (d) 29

41. How many persons would be reading almost two newspapers? **[December-2009]**

(a) 23 (b) 25
(c) 27 (d) 48

42. What will be the next term in the following ?

DCXW, FEVU, HGTS, ? **[December-2009]**

(a) AKPO (b) ABYZ
(c) JIRQ (d) LMRS

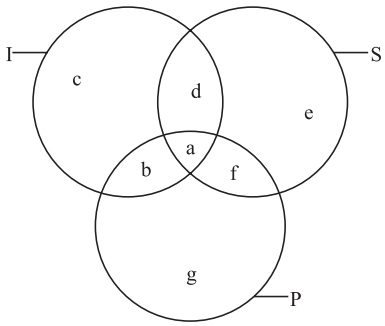
43. The next number in the series 2, 5, 9, 19, 37, ? will be **[December-2009]**

(a) 74 (b) 75
(c) 76 (d) None of the above

44. Which one of the following represent the binary equivalent of the decimal number 23? **[June-2010]**

(a) 01011 (b) 10111
(c) 10011 (d) None of the above

DIRECTIONS (Qs. 45-46): are based on the following diagram in which there are three intersecting circles I, S and P where circle I stands for Indians, circle S stands for scientists and circle P for politicians. Different regions of the figure are lettered from a to g.



45. The region which represents non- Indian scientists who are politicians. **[June-2010]**

(a) f (b) d
(c) a (d) c

46. The region which represents politicians who are Indians as well as scientists. **[June-2010]**
(a) b (b) c
(c) a (d) d

47. Find the next number in the following series: **[June-2010]**
2, 5, 10, 17, 26, 37, 50, ?
(a) 63 (b) 65
(c) 67 (d) 69

48. If INSURANCE is coded as ECNARUSNI, how HINDRANCE will be coded ? **[June-2010]**
(a) CADNIHWCE (b) HANODEINR
(c) AENIRHDCN (d) ECNARDNIH

49. E is the son of A, D is the son of B, E is married to C, C is the daughter of B. How is D related to E ? **[June-2010]**
(a) Brother (b) Uncle
(c) Father-in-law (d) Brother-in-law

50. If water is called food, food is called tree, tree is called earth, earth is called world, which of the following grows a fruit ? **[June-2010]**
(a) Water (b) Tree
(c) World (d) Earth

51. If 5472 = 9, 6342 = 6, 7584 = 6, what is 9236 ? **[December-2010]**
(a) 2 (b) 3
(c) 4 (d) 5

52. The letters in the first set have certain relationship. On the basis of this relationship, make the right choice for the second set : **[December-2010]**
AF : IK : : LQ : ?
(a) MO (b) NP
(c) OR (d) TV

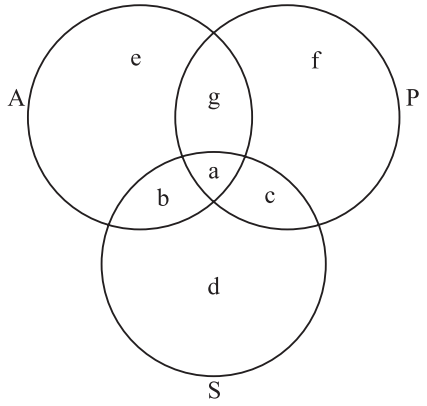
53. In a certain code, PAN is written as 31 and PAR as 35, then PAT is written in the same code as **[December-2010]**
(a) 30 (b) 37
(c) 39 (d) 41

54. Find the wrong number in the sequence :
52, 51, 48, 43, 34, 27, 16 **[December-2010]**
(a) 27 (b) 34
(c) 43 (d) 48

55. Determine the relationship between the pair of words ALWAYS : NEVER and then select from the following pair of words which have a similar relationship : **[December-2010]**
(a) often : rarely
(b) frequently : occasionally
(c) constantly : frequently
(d) intermittently : casually

56. If a rectangle were called a circle, a circle a point, a point a triangle and a triangle a square, the shape of a wheel is **[June-2011]**
(a) Rectangle (b) Circle
(c) Point (d) Triangle

DIRECTIONS (Qs. 57-59): are based upon the following diagram in which there are three interlocking circles A, P and S where A stands for Artists, circle P for Professors and circle S for Sportspersons.
Different regions in the figure are lettered from a to f :



57. The region which represents artists who are neither sportsmen nor professors. **[June-2011]**
(a) d (b) e
(c) b (d) g

58. The region which represents professors, who are both artists and sportspersons. **[June-2011]**
(a) a (b) c
(c) d (d) g

59. The region which represents professors, who are also sportspersons, but not artists. **[June-2011]**
(a) e (b) f
(c) c (d) g

60. If A = 5, B = 6, C = 7, D = 8 and so on, what do the following numbers stand for? **[June-2011]**
17, 19, 20, 9, 8
(a) Plane (b) Moped
(c) Motor (d) Tonga

61. The letters in the first set have certain relationship. On the basis of this relationship, make the right choice for the second set : **[June-2011]**
K/T : 11/20 :: J/R : ?
(a) 10/8 (b) 10/18
(c) 11/19 (d) 10/19

62. If HOBBY is coded as IOBY and LOBBY is coded as MOBY; then BOBBY is coded as **[June-2011]**
(a) BOBY (b) COBY
(c) DOBY (d) OOBY

63. Find the wrong number in the sequence **[June-2011]**
125, 127, 130, 135, 142, 153, 165
(a) 130 (b) 142
(c) 153 (d) 165

64. Determine the relationship between the pair of words NUMERATOR : DENOMINATOR and then select the pair of words from the following which have a similar relationship: **[June-2011]**

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(a) fraction : decimal (b) divisor : quotient
(c) top : bottom (d) dividend : divisor

65. If '367' means 'I am happy'; '748' means 'you are sad' and '469' means 'happy and sad' in a given code, then which of the following represents 'and' in that code ? **[December-2011]**
(a) 3 (b) 6
(c) 9 (d) 4

66. Find the next letter for the series MPSV..... **[December-2011]**
(a) X (b) Y
(c) Z (d) A

67. What is the number that comes next in the sequence ?
2, 5, 9, 19, 37, _____ **[December-2011]**
(a) 76 (b) 74
(c) 75 (d) 50

68. Six persons A, B, C, D, E and F are standing in a circle. B is between F and C, A is between E and D, F is to the left of D. Who is between A and F ? **[June-2012]**
(a) B (b) C
(c) D (d) E

69. Given that in a code language, '645' means 'day is warm'; '42' means 'warm spring' and '632' means 'spring is sunny'; which digit represents 'sunny'? **[June-2012]**
(a) 3 (b) 2
(c) 4 (d) 5

70. Find the next letter for the series YVSP ……
(a) N (b) M
(c) O (d) L

71. Which is the number that comes next in the following sequence ? **[June-2012]**
2, 6, 12, 20, 30, 42, 56, _____
(a) 60 (b) 64
(c) 72 (d) 70

72. If MOHAN is represented by the code KMFYL, then COUNT will be represented by **[December-2012]**
(a) AMSLR (b) MSLAR
(c) MASRL (d) SAMLR

73. The missing number in the series : **[December-2012]**
0, 6, 24, 60, 120, ?, 336, is
(a) 240 (b) 220
(c) 280 (d) 210

74. P is the father of R and S is the son of Q and T is the brother of P. If R is the sister of S, how is Q related to T ? **[June-2013]**
(a) Wife (b) Sister-in-law
(c) Brother-in-law (d) Daughter-in-law

75. Choose the proper alternative given in the codes to replace the question mark. **[June-2013]**
Bee – Honey, Cow – Milk, Teacher – ?
(a) Intelligence (b) Marks
(c) Lessons (d) Wisdom

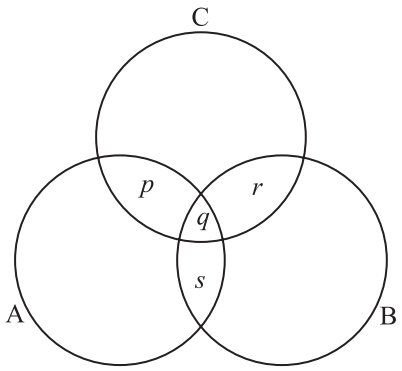
76. The missing number in the series **[June-2013]**
40, 120, 60, 180, 90, ?, 135 is
(a) 110 (b) 270
(c) 105 (d) 210

77. In a certain code GALIB is represented by HBMJC. TIGER will be represented by **[June-2013]**
(a) UJHFS (b) UHJSF
(c) JHUSF (d) HUJSF

78. A man pointing to a lady said, "The son of her only brother is the brother of my wife". The lady is related to the man as **[December-2013]**
(a) Mother's sister (b) Grand mother
(c) Mother-in-law (d) Sister of Father-in-law

79. In certain code TEACHER is written as VGCEJGT. The code of CHILDREN will be **[December-2013]**
(a) EKNJFTGP (b) EJKNFTGP
(c) KNJFGTP (d) None of these

80. Given below is a diagram of three circles A, B & C inter-related with each other. The circle A represents the class of Indians, the circle B represents the class of scientists and circle C represents the class of politicians. p, q, r, s ... represent different regions. Select the code containing the region that indicates the class of Indian scientists who are not politicians. **[June-2014]**



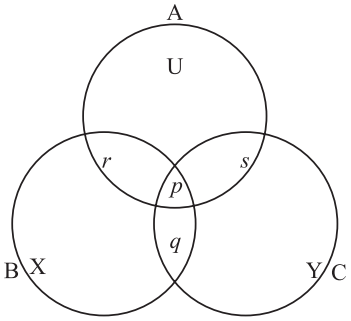
Codes :
(a) q and s only (b) s only
(c) s and r only (d) p, q and s only

81. Complete the series BB, FE, II, ML, PP, ... by choosing one of the following option given: **[June-2014]**
(a) TS (b) ST
(c) RS (d) SR

82. If the series 4, 5, 8, 13, 14, 17, 22, ... is continued in the same pattern, which one of the following is not a term of this series? **[June-2014]**
(a) 31 (b) 32
(c) 33 (d) 35

83. In certain coding method, the word ANSWER is encoded as SFXTOB. In this coding, what is the code word for the word RESPONSE? **[June-2014]**
(a) OMESUCEM (b) OMESICSM
(c) FTOPQTFS (d) OMESISCM

84. Given below is a diagram of three circles A, B and C overlapping each other? The circle A represents the class of honest people, the circle B represent the class of sincere people and circle C represents the class of politicians. p, q, r, s, U, X, Y represent different regions. Select the code that represents the region indicating the class of honest politicians who are not sincere. **[December-2014]**



(a) X (b) q
(c) p (d) s

85. Warrior is related to sword, carpenter is related to saw, farmer is related to plough. In the same way, the author is related to **[December-2014]**
(a) Book (b) Fame
(c) Reader (d) Pen

86. A is brother of B. B is the brother of C. C is the husband of D. E is the father of A. D is related to E as **[December-2014]**
(a) Daughter (b) Daughter-in-law
(c) Sister-in-law (d) Sister

87. If STREAMERS is coded as UVTGALDQR, then KNOWLEDGE will be coded as **[December-2014]**
(a) MQPYLCDFD (b) MPQYLDCFD
(c) MYQLDFCD (d) YMQPLDDFC

88. The next term in the series: AB, ED, IH, NM, ——— is **[December-2014]**
(a) TS (b) ST
(c) TU (d) SU

89. The next term in the series: 2, 7, 28, 63, 126, ——— is **[December-2014]**
(a) 215 (b) 245
(c) 276 (d) 296

90. A girl introduced a boy as the son of the daughter of the father of her uncle. The boy is related to the girl as : **[June-2015]**
(a) Brother (b) Uncle
(c) Nephew (d) Son

91. In certain code MATHURA is coded as JXQEROX. The code of HOTELS will be : **[June-2015]**
(a) LEQIBP (b) ELQBIP
(c) LEBIQP (d) ELIPQB

92. The next term in the series is : **[June-2015]**
2, 5, 9, 19, 37,?
(a) 73 (b) 75
(c) 78 (d) 80

93. P and Q are brothers. R and S are sisters. The son of P is brother of S. Q is related to R as : **[December-2015]**
(a) Son (b) Brother
(c) Uncle (d) Father

94. A party was held in which a grandmother, father, mother, four sons, their wives and one son and two daughters to each of the sons were present. The number of females present in the party is : **[December-2015]**
(a) 12 (b) 14
(c) 18 (d) 24

95. The next term in the series :
B2E, D5H, F12K, H27N, ? is : **[December-2015]**
(a) J 5 6 I (b) I 6 2 Q
(c) Q 6 2 J (d) J 5 8 Q

96. The next term in the series
2, 5, 10, 17, 26, 37, ? is : **[December-2015]**
(a) 50 (b) 57
(c) 62 (d) 72

97. In the series 3, 11, 23, 39, 59 ..... **[July-2016]**
The next term will be
(a) 63 (b) 73
(c) 83 (d) 93

98. In certain code, SELECTION is coded as QCJCARGML. The code of AMERICANS will be **[July-2016]**
(a) YKCPGAYLQ (b) BNFSJDBMR
(c) QLYAGPCKY (d) YQKLCYPAG

99. In the series
AB, EDC, FGHI, ... ?...., OPQRST, the missing term is **[July-2016]**
(a) JKLMN (b) JMKNL
(c) NMLKJ (d) NMKLJ

100. A is sister of B. F is daughter of G. C is mother of B. D is father of C. E is mother of D. A is related to D as **[July-2016]**
(a) Grand daughter (b) Daughter
(c) Daughter-in-law (d) Sister

101. C and D are sisters. A and B are brothers. E is son of A and brother of D. B is related to C as **[August-2016]**
(a) Brother (b) Son
(c) Uncle (d) Father-in-law

102. In the series : AYD, BVF, DRH, GMJ,? , the next term is **[August-2016]**
(a) GLK (b) HLM
(c) LHM (d) KGL

103. In the series
1, 5, 13, 25, 41, ……., the next term is **[August-2016]**
(a) 59 (b) 63
(c) 61 (d) 68

104. In a particular code, HOSPITALS is coded as HSOLSAPTI. The code of BIOLOGICALS will be **[August-2016]**

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(a) BLICOALIOSG (b) BOLGICAILOS
(c) SBLAOILOBCG (d) BSILOALCOIG

105. Out of four cities given below three are alike in some manner while the fourth one is different. Identify the odd one **[January-2017]**
(a) Lucknow (b) Rishikesh
(c) Allahabad (d) Patna

106. If A is coded as C, M as I, N as P, S as O, I as A, P as N, E as M, O as E and C as S, then the code of COMPANIES will be **[January-2017]**
(a) SPEINMOAC (b) NCPSEIOMA
(c) SMOPIEACN (d) SEINCPAMO

107. The next term in the following series **[January-2017]**
YEB, WFD, UHG, SKI ? will be
(a) TLO (b) QOL
(c) QLO (d) GQP

108. The missing term in the series 1, 4, 27, 16, ?, 36, 343, … is **[January-2017]**
(a) 30 (b) 49
(c) 125 (d) 81

109. Ajay is a friend of Rakesh. Pointing to an old man Ajay asked Rakesh who is he ? Rakesh said "His son is my son's uncle". The old man is related to Rakesh as : **[November-2017]**
(a) Grandfather (b) Father-in-law
(c) Father (d) Uncle

110. In certain code, "COVALENT" is coded as BWPDUOFM. The code of "ELEPHANT" will be : **[November-2017]**
(a) MFUIQRTW (b) QMUBIADH
(c) QFMFUOBI (d) EPHNTEAS

111. The next term in the series ABD, DGK, HMS, MTB, ... is: **[November-2017]**
(a) NSA (b) SBL
(c) PSK (d) RUH

112. In the series 1, 6, 15, 28, 45, ... the next term will be : **[November-2017]**
(a) 66 (b) 76
(c) 56 (d) 84

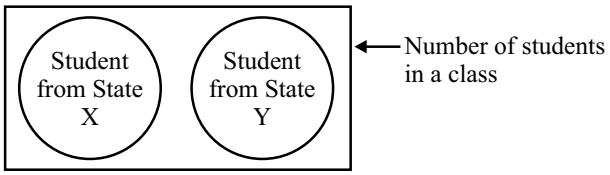
113. Introducing Rakesh to her husband a women said, "His brother's father is the only son of my grandfather". The woman is related to Rakesh as : **[July-2018]**
(a) Aunt (b) Mother
(c) Sister (d) Daughter

114. If VARANASI is coded as WCUESGZQ, then the code of KOLKATA will be : **[July-2018]**
(a) LOQOZEH (b) HLZEOOQ
(c) ZELHOQO (d) LQOOFZH

115. The next term in the series **[July-2018]**
ABD, DGK, HMS, MTB, SBL,.....?.....is :
(a) ZKU (b) ZCA
(c) ZKW (d) KZU

116. The next term in the series **[July-2018]**
-1, 5, 15, 29,..... ?..... is :
(a) 36 (b) 47
(c) 59 (d) 63

Look at the following diagram : **[December-2018]**



Suppose you are given the following :
(A) Number of students in the class = 1,000
(B) Number of students in the class from State X = 200
(C) Number of students in the class from State Y = 300
With the above information, answer the following two questions **(117-118):**

117. Suppose that 40% of the students in the class are female students. The number of female students from State X is 50 while the number of female students from State Y is 180. What is the number of female students from other states in the class? **[December-2018]**
(a) 150 (b) 100
(c) 130 (d) 170

118. What is the percentage (%) of students from States other than X and Y in the class? **[December-2018]**
(a) 20% (b) 10%
(c) 30% (d) 50%

119. Pointing to the photograph of a girl, Sukanya said, "She is the daughter of the only daughter of my mother".
How is Sukanya related to the girl in the photograph? **[December-2018]**
(a) Aunt (b) Sister
(c) Mother (d) Information incomplete

120. The next term in the letter series IN, HL, GJ, FH, EF, _____ is **[December-2018]**
(a) BC (b) DE
(c) DD (d) BD

121. If FIST is coded as JMWX, then the code for BOAT will be **[December-2018]**
(a) BCFX (b) ESFX
(c) CDEX (d) FSEX

122. The next term in the number series 41, 27, 16, 8, _____ is **[December-2018]**
(a) 3 (b) 2
(c) 1 (d) 4

123. In the sequence of numbers

$\frac{2}{3}, \frac{4}{7}, X, \frac{11}{21}, \frac{16}{31}$

the missing number X is: **[December-2004]**

(a) $\frac{8}{10}$ (b) $\frac{6}{10}$

(c) $\frac{5}{10}$ (d) $\frac{7}{13}$

124. If A stands for 5 , B for 6, C for 7, D for 8, and so on, what do the following numbers stand for:

22, 25, 8, 22 and 5 ? **[20th June 2019-Ist Shift]**

(a) PRIYA (b) NEEMA

(c) MEENA (d) RUDRA

125. A, B, C, D, E and F are six members in a family in which there are two married couples. E, a teacher is married to the doctor, who is the mother of C and F. B, the layer is married to A. A has one son and one grandson. Of the two married ladies, one is a housewife. There is also one student and one male engineer in the family. How is A related to C?

[20th June 2019-Ist Shift]

(a) Grandfather (b) Mother

(c) Sister (d) Grandmother

126. Choose the missing term out of the following:

JAK, KBL, LCM, MDN, _____.

(a) OEP (b) NEO (c) MEN (d) PFQ

127. Choose the missing term out of the given alternatives: **[20th June 2019-IInd Shift]**

QPO, NML, KJI, _____.

(a) HGF (b) CAB (c) JKL (d) GHI

128. Choose the missing term out of the given alternatives: **[21st June 2019-Ist Shift]**

TEF, UGH, _____, WKL

(a) CMN (b) UJI

(c) VIJ (d) IJT

129. Choose the correct alternative.

Cup is to coffee as bowl is to _____. **[21st June 2019-IInd Shift]**

(a) Dish (b) Soup

(c) Spoon (d) Food

130. If RED is coded as 6720, then how would GREEN be coded? **[24th June 2019-IInd Shift]**

(a) 16717209 (b) 1677209

(c) 9207716 (d) 1677199

131. If in a certain code, BAT = 23 and CAT = 24, then how you will code BALL? **[25th June 2019-Ist Shift]**

(a) 27 (b) 28

(c) 82 (d) 39

132. If E = 5 and HOTEL = 12, how will you code BALM? **[25th June 2019-IInd Shift]**

(a) 28 (b) 26

(c) 16 (d) 7

133. If DRIVER = 12, GOVERNMENT = 20, BELIEVED = 16, then BAT = ? **[26th June 2019-IInd Shift]**

(a) 6 (b) 8

(c) 10 (d) 12

134. If 'SOLUTION is 'R5KTSH5M' then 'CROME' will be written as **[2nd Dec. 2019-Ist Shift]**

(a) BQ5HL (b) B5QLH

(c) BQ5LD (d) BS5LH

135. What is the missing term in the series given below? 2, 4, 6, 12, 10, 36, 14,? 18, 324, _____ **[2nd Dec. 2019-IInd Shift]**

(a) 50 (b) 72

(c) 108 (d) 18

136. The next term in the series, AT, EQ, IN, OK,... is **[2nd Dec. 2019-IInd Shift]**

(a) UH (b) UP

(c) US (d) UU

137. In a certain code "ENGLAND" is written as "ULSNYLV". Using the same code, "IRELAND" will be Written as **[2nd Dec. 2019-IInd Shift]**

(a) HQUNYLV (b) QHUNYLV

(c) QUHNYLV (d) HUQNYLV

138. Apoorav is son of Madhu. Vinod is brother of Madhu's husband. How is Apoorav related to Vinod? **[2nd Dec. 2019-IInd Shift]**

(a) Uncle (b) Brother

(c) Nephew (d) Cousin

139. Which one is the wrong number in the given series? **[3rd Dec. 2019-Ist Shift]**

3, 13, 43, 53, 63, 83

(a) 13 (b) 53

(c) 63 (d) 83

140. The number X in the following series: **[6th Dec. 2019-Ist Shift]**

3, 8, 18, 38, X ... is

(a) 78 (b) 80

(c) 76 (d) 74

141. If *HPU* = 9, *JNU* = 9, then *DU* = ? **[3rd Dec. 2019-Ist Shift)]**

(a) 5 (b) 6 (c) 4 (d) 7

142. *A* is father of *B* and *C* is sister of *A*. *D* is grandson of *C*. How is *D* related to *B*? **[3rd Dec. 2019-Ist Shift]**

(a) Uncle (b) Nephew

(c) Cousin (d) Grandson

143. The next term of the series 1s 1D3, 3H5, 5L7, _____, _____ **[3rd Dec. 2019-IInd Shift]**

(a) 7 P 9 (b) 7 R 9

(c) 7 N 9 (d) 7 L 9

144. B is the only daughter of maternal grandmother of A. How is A related to B? **[3rd Dec. 2019-IInd Shift]**

(a) Sister (b) Daughter

(c) Cousin (d) Mother

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145. In a certain code "CREDIT" is written as "EPGBKR" and in the same code. "DEBIT" will be written as **[3rd Dec. 2019-IInd Shift]**

(a) FDCGV (b) FGCDV
(c) FCDGV (d) FCDVG

146. In a certain coding language, 'AEIOU' is written as "TNHDZ'. Using the same coding Language, 'BFJPV will be written as **[4th Dec. 2019-Ist Shift]**

(a) UOIEA (b) AEIOU
(c) CGKQW (d) WQKGC

147. Which given of the following sets of letters when sequentially placed at the gaps in the letteres below shall complete it? **[4th Dec. 2019-IInd Shift]**

bb_b_ab_cbba_bcbb_

(a) acbac (b) acbbb
(c) cbbba (d) abbbc

148. If the word TEACHER is coded as TCJACCV and the word SURGEON is coded as PMGETSU in a certain code language, then which of the following will represent the word CONCORD in that language? **[5th Dec. 2019-Ist Shift]**

(a) FPQEPQE (b) EQPEQTF
(c) FPQAPME (d) EMPAQPF

149. Pointing towards a man, a woman said. "His wife's father is the husband of my mother's only daughter". How is the woman related to the man? **[5th Dec. 2019-Ist Shift]**

(a) Daughter (b) Sister -in - Law
(c) Sister (d) Mother - in - law

150. Which of the following numbers would occur next in the series 2, 6, 30, 60, 130, 210_____? **[5th Dec. 2019-Ist Shift]**

(a) 330 (b) 350
(c) 370 (d) 378

151. Bangalore is bigger than Jhansi, Satpura is bigger than Chittor, Rajgarh is not as big as Jhansi but is bigger than Satpura. Which is the smallest? **[5th Dec. 2019-Ist Shift]**

(a) Bangalore (b) Jhansi
(c) Satpura (d) Chittor

152. If REASON is coded as 5 and GOVERNMENT as 9, then what is the code for ACCIDENT?**[5th Dec. 2019-Ist Shift]**

(a) 6 (b) 7 (c) 8 (d) 9

153. Given below are two statements ~ One is labelled as Assertion (A) and the other is labelled as Reason (R) **[5th Dec. 2019-Ist Shift]**

Assertion (A): Communication does not include all human behaviour for exchange of information

Reason (R): Communication involves the use of all five senses.

Choose the correct option from the following:

(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(c) (a) is true, but (R) is false
(d) (a) is false, but (R) is true

154. Identify the term 'X' in the following series **[6th Dec. 2019-Ist Shift]**

4, 12, 42, 168, X

(a) 588 (b) 672
(c) 756 (d) 772

155. Determine the term 'X' in the following series **[6th Dec. 2019-IInd Shift]**

2, 9, 20, 35, 54, 77, 'X'

(a) 104 (b) 102 (c) 89 (d) 110

156. The missing term in the series **[6th Dec. 2019-IInd Shift]**

2, 7, 24, 77, ?, 723 is

(a) 238 (b) 432
(c) 542 (d) 320

157. In certain code HEALTH is written as KHDOWK. The code of NORTH will be **[6th Dec. 2019-IInd Shift]**

(a) QRUWK (b) RQWUK
(c) RWQUK (d) RWUKQ

158. Choose the appropriate alternative given in the codes to replace the question mark. **[6th Dec. 2019-IInd Shift]**

Examiner – Examinee, Pleader – Client, Preceptor – ?

(a) Customer (b) Path-finder
(c) Perceiver (d) Disciple

159. Oar is to rowboat as foot is to:**[6th Dec. 2019-IInd Shift]**

(a) running (b) sneaker
(c) skateboard (d) jumping

HINTS & EXPLANATION

1. (b) As,

B	L	O	O	D
2	4	1	1	3

and

B	R	U	S	T
2	0	6	7	8

R	O	B	U	S	T
0	1	2	6	7	8

2. (b) As

B	F
+5 ↓	+5 ↓
G	K

Same as

L	P
+5 ↓	+5 ↓
Q	U

3. (a) As

B	L	O	O	D
2	4	1	1	3

and

B	U	R	S	T
2	0	6	7	8

Same as,

R	O	B	U	S	T
6	1	2	0	7	8

4. (b) As

1 2 3 4 5 6 1 2 4 3 5 6

R O U N D S → R O N U D S

Same as,

1 2 3 4 5 6 1 2 4 3 5 6

P L E A S E → P L A E S E

5. (c) 8, 24, 12, [36], 18, 54

×3, ÷2, ×3, ÷2, ×3

6. (c) As,

F	H	Q	K
+1 ↓	+1 ↓	+1 ↓	+1 ↓
G	I	R	L

Same as,

W	O	M	E	N
+1 ↓	+1 ↓	+1 ↓	+1 ↓	+1 ↓
X	P	N	F	O

7. (d) $\frac{16}{32} \xrightarrow{-1} \frac{15}{33} \xrightarrow{+2} \frac{17}{31} \xrightarrow{-3} \frac{14}{34} \xrightarrow{+4} \boxed{\frac{18}{30}}$

(+1, −2, +3, −4)

8. (b) As,

P	A	N
↓	↓	↓

16 + 1 + 14 = 31

and

P	A	R
↓	↓	↓

16 + 1 + 18 = 35

Same as,

P	A	T
↓	↓	↓

16 + 1 + 20 = 37

9. (d) As,

A	S	T
+1 ↓	−1 ↓	+1 ↓
B	R	U

Same as,

N	Q	V
+1 ↓	−1 ↓	+1 ↓
O	P	W

10. (b) As,

A	B	C	D
1	2	3	4
+4 ↓	+4 ↓	+4 ↓	+4 ↓
5	6	7	8

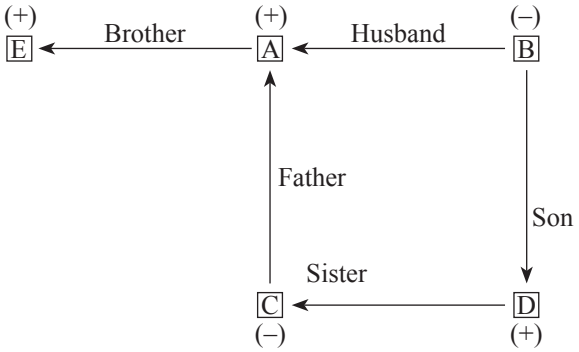
Same as,

17	19	20	9	8
−4 ↓	−4 ↓	−4 ↓	−4 ↓	−4 ↓
13	15	16	5	4
M	O	P	E	D

11. (c) 8, 24, 12, [36], 18, 54

×3, ×3, ×3

12. (c)



Hence, B is Sister-in-law of E

13. (b) As,

T	R	I	V	A	N	D	R	U	M
2	5	9	5	3	5	4	7	5	8

Same as,

M	U	D	I	T
8	5	4	9	2

14. (c)

9	8	8	8	7	8	6	8
	−1		−1		−1		

(×1, ×1, ×1)

15. (*) $\frac{36}{62} \xrightarrow{+3} \frac{39}{63} \xrightarrow{+4} \frac{43}{61} \xrightarrow{+5} \frac{48}{64} \xrightarrow{+6} \boxed{\frac{54}{60}}$

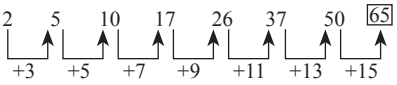
(+1, −2, +3, −4)

16. (c) $49 \Rightarrow 4 + 9 = 13 \Rightarrow 1 + 3 = 4 = 2^2$
$63 \Rightarrow 6 + 3 = 9 = 3^2$
$77 \Rightarrow 7 + 7 = 14 \Rightarrow 1 + 4 = 5$
$81 \Rightarrow 8 + 1 = 9 = 3^2$
So 77 is odd.

17. (b) Except Knight, Nun, Monk, Priest all are the positions in different worship place.

18. (c) As, $4^2 + 1 = 16 + 1 = 17$
Same as, $7^2 + 1 = 49 + 1 = 50$

19. (b)

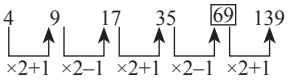


20. (a) The region 'f' represents Non-Indian Scientists who are Politicians.

21. (b) The region 'c' represents Indians who are neither Scientists nor Politicians.

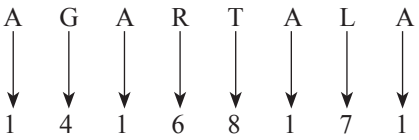
22. (c) The region 'a' represents Politicians who are Indians as well as Scientists.

23. (d)

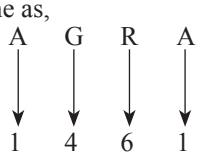


24. (a) 4 $(4)^2$ 8 $(8)^2$ 16 $(16)^2$

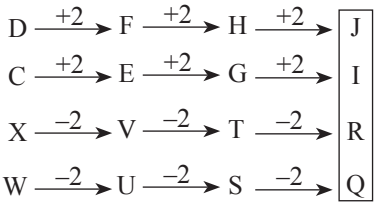
25. (d) As,



Same as,



26. (c)

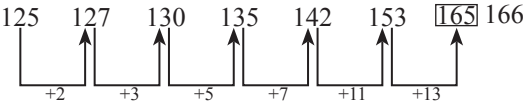


27. (c) 'f' represents the graduates who are government employees but not as clerk.

28. (d) 'h' represents the clerks who are graduates as well as government employees.

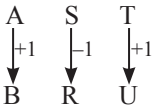
29. (d) 'e' represents the graduates who are clerks but not government employees.

30. (d)

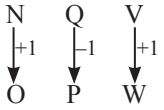


Here the difference between all the given number is a prime number except 165.
∴ Wrong number = 165

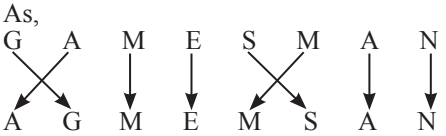
31. (d) As,



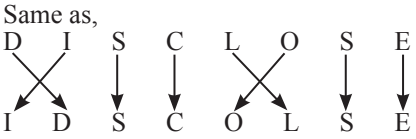
Same as,



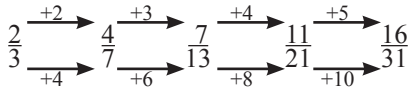
32. (a) As,



Same as,



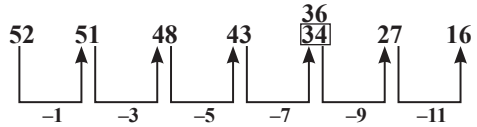
33. (d)



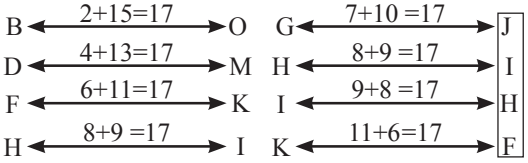
34. (c) 'c' represents the Hindi and English Knowing teachers.

35. (b) 'g' represents the only Hindi Knowing persons.

36. (b)

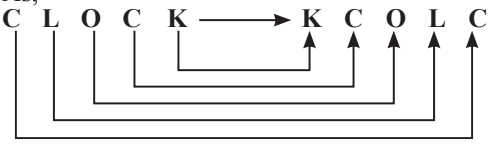


37. (d) As,

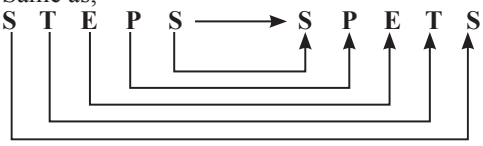


Same as,

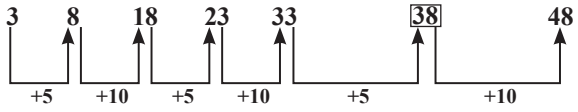
38. (c) As,



Same as,



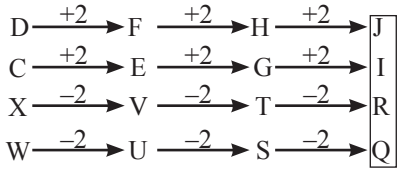
39. (c)



40. (c) Persons who reading at least two news papers
= 8 + 5 + 12 + 2 = 27

41. (d) Persons who are reading almost two news Papers.
= 50 – 2 = 48

42. (c)



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43. (b) 2 5 9 19 37 [75]

×2+1 ×2–1 ×2+1 ×2–1 ×2+1

44. (b) Binary equivalent of the decimal numbers –

0	0
20	10100
21	10101
22	10110
23	10111

45. (a) Region 'f' represents the Non-Indian Scientists who are politicians.

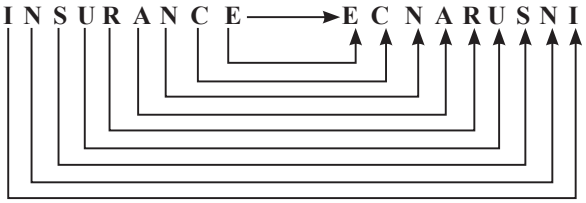
46. (c) Region 'a' represents politicians who are Indians as well as Scientists.

47. (b)

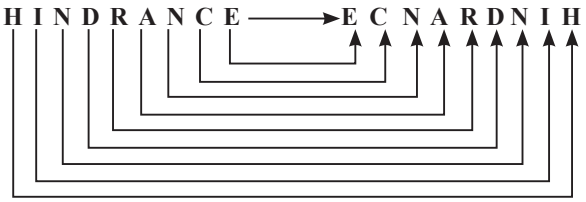
2 5 10 17 26 37 50 [65]

+3 +5 +7 +9 +11 +13 +15

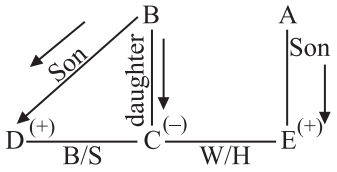
48. (d) As,



Same as,



49. (d)



Where,

+ → male

– → female

B/S → Brother/Sister

W/H → Wife/Husband

So D is the Brother-in-law of E.

50. (d) Fruit grows on tree but here tree is called earth. So fruit grows on earth.

51. (a) 5472 ⇒ 5 + 4 + 7 + 2 = 18 ⇒ 1 + 8 = 9

6342 ⇒ 6 + 3 + 4 + 2 = 15 ⇒ 1 + 5 = 6

7584 ⇒ 7 + 5 + 8 + 4 = 24 ⇒ 2 + 4 = 6

9236 ⇒ 9 + 2 + 3 + 6 = 20 ⇒ 2 + 0 = 2

52. (d) As,

A $\xrightarrow{+8}$ I

F $\xrightarrow{+5}$ K

Same as,

L $\xrightarrow{+8}$ [T]

Q $\xrightarrow{+5}$ [V]

53. (b) As,

P A N

↓ ↓ ↓

16 + 1 + 14 = 31

and

P A R

↓ ↓ ↓

16 + 1 + 18 = 35

Same as,

P A T

↓ ↓ ↓

16 + 1 + 20 = [37]

54. (b) In the series number are decreasing in odds – 1, 3, 5

52 51 48 43 [36] 27 16

–1 –3 –5 –7 –9 –11

In place of 34, the number should be 36.

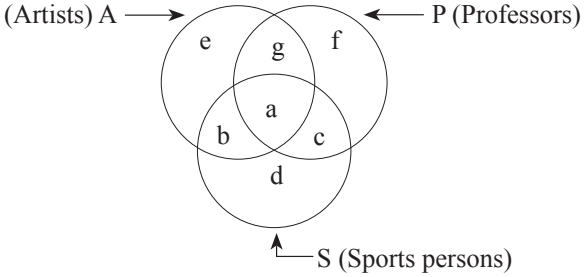
55. (a) The antonym of **Always** is **Never**. The option (a) is correct because the antonym of **often** is **rarely**.

56. (c) Since

rectangle circle point triangle square

∴ The shape of a wheel is point.

For Sol. 57 to 59



57. (b) 'e' represents artists who are neither sportsments nor professors.

58. (a) 'a' represents professors, who are both artists and sportspersons.

59. (c) 'c' represents professors, who are also sports persons but not artists.

60. (b) ∴ A = 5, B = 6, C = 7, D = 8

∴ E = 9, F = 10, G = 11, H = 12, I = 13,
J = 14, K = 15, L = 16, M = 17, N = 18,
O = 19, P = 20, Q = 21, R = 22, S = 23.....

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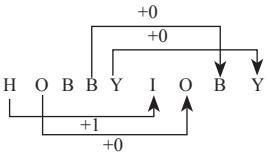
Therefore, 17 = M
19 = O
20 = P
9 = E
8 = D

61. (b)

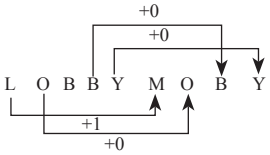
A	B	C	D	E	F	G	H	I	J
1	2	3	4	5	6	7	8	9	10
K	L	M	N	O	P	Q	R	S	T
11	12	13	14	15	16	17	18	19	20
U	V	W	X	Y	Z				
21	22	23	24	25	26				

Place value of all alphabets
K→11
T→20
J→10
R→18

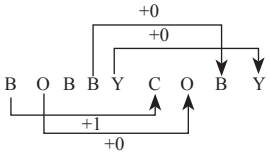
62. (b) As,



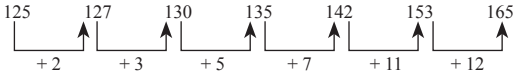
and,



Same as,



63. (d)

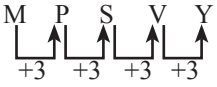


Except 12, all other are prime numbers

64. (d) Numerator is divided by denominator.
Similarly Dividend is divided by divisor.

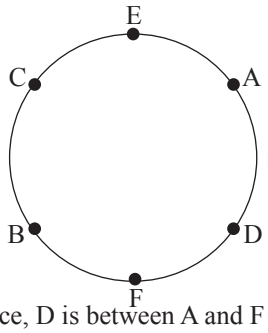
65. (c) I am **happy** = 3 6 7 ....(1)
You are **sad** = 7 4 8 ....(2)
happy and **sad** = 4 6 9 ....(3)
From (1) and (3)
Happy = 6
and from (2) and (3)
Sad = 4
∴ and = 9

66. (b)



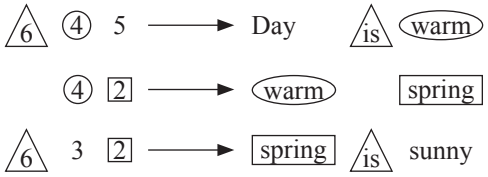
67. (c) $2 \times 2 + 1 = 5$
$5 \times 2 - 1 = 9$
$9 \times 2 + 1 = 19$
$19 \times 2 - 1 = 37$
$\therefore 37 \times 2 + 1 = 75$

68. (c)



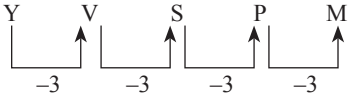
Hence, D is between A and F

69. (a)

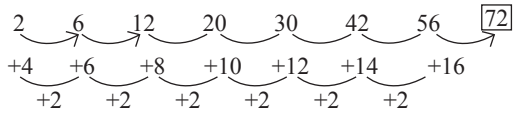


Sunny = 3

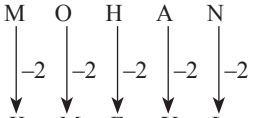
70. (b)



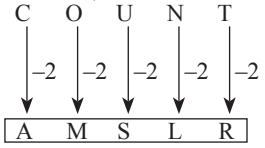
71. (c)



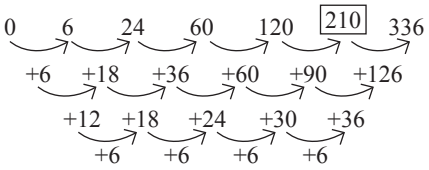
72. (a) As



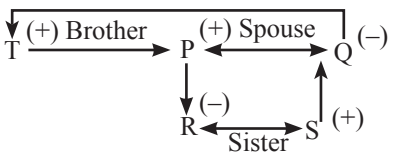
Same as,



73. (d)



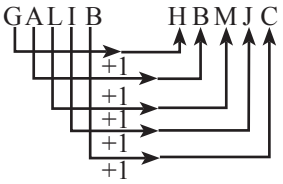
74. (b)



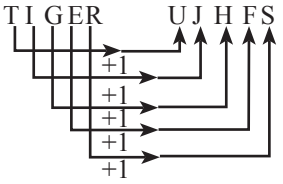
75. (d) As, Bee give us honey and Cow gives milk, similarly from teacher we get wisdom.

76. (b) 40 120 60 180 90 [270] 135
×3 ÷2 ×3 ÷2 ×3 ÷2

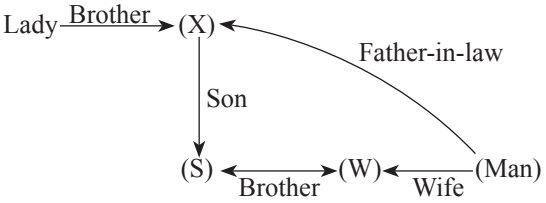
77. (a) As,



Same as,

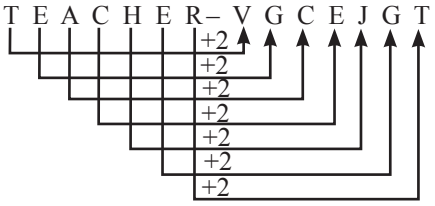


78. (d) According to question only one brother of ladies son will be brother in law.

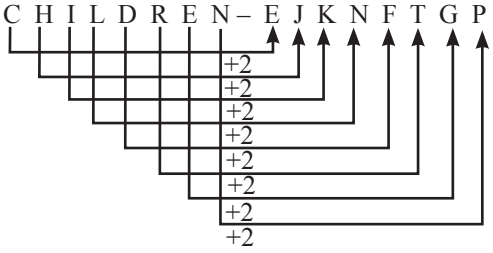


∴ That ladies will be called sister of his father-in-law.

79. (b) As,

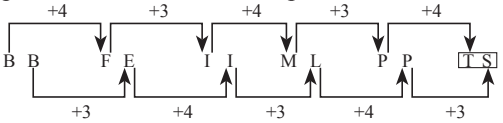


Similarly,



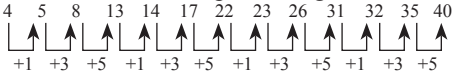
80. (b) Since C represents politicians. Hence, Indian Scientists who are not politicians will indicate the letter which present in A and C but not present in C i.e. 'S'.

81. (a)



Hence, TS will complete the given series.

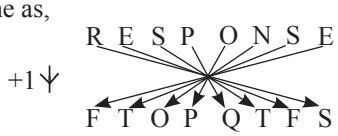
82. (c)



Hence, it is clear from above series that 33 is not a term of this series.

83. (c) As

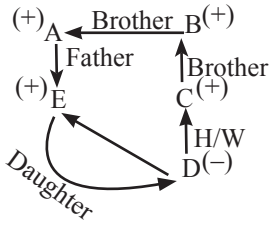
Same as,



84. (d) Elements of A = U, *r*, *p*, *s* (honest)
Elements of B = X, *r*, *p*, *q* (sincere)
Elements of C = *p*, *q*, *s*, Y (politician)
Hence (honest and politician but not sincere)
∴ Required code is s which is in A and C. But not in B.

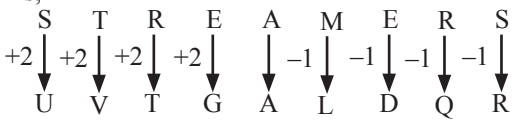
85. (d) As tool of Warrior is related to sword, tool of carpenter is related to saw and tool of Farmer is related to ploygh, same as tool of author is related to pen.

86. (b)

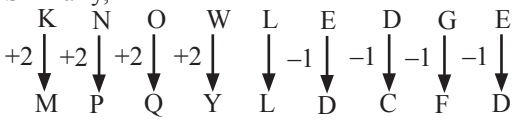


Hence, D is the daughter in law of E.

87. (b) As,

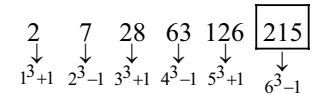


Similarly,

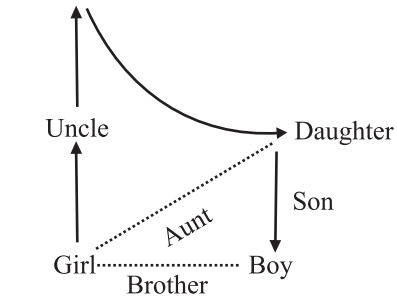


88. (a)

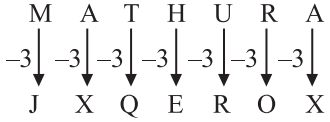
89. (a)



90. (a) Uncle's father



91. (b) As,



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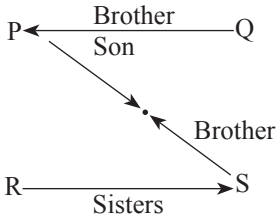
Same as,

H O T E L S
–3 –3 –3 –3 –3 –3 –3
E L Q B I P

92. (b) 2, 5, 9, 19, 37, [75]
×2+1 ×2–1 ×2+1 ×2–1 ×2+1

93. (c)



∴ Q is the uncle of R.

94. (b) Required number of females
= 1 + 1 + 4 + 4 × 2
= 6 + 8 = 14

95. (d) B $\xrightarrow{+2}$ D $\xrightarrow{+2}$ F $\xrightarrow{+2}$ H $\xrightarrow{+2}$ J
2 $\xrightarrow{\times 2+1}$ 5 $\xrightarrow{\times 2+2}$ 12 $\xrightarrow{\times 2+3}$ 27 $\xrightarrow{\times 2+4}$ 58
E $\xrightarrow{+3}$ H $\xrightarrow{+3}$ K $\xrightarrow{+3}$ N $\xrightarrow{+3}$ Q

96. (a) 2, 5, 10, 17, 26, 37, [50]
+3 +5 +7 +9 +11 +13

97. (c) 3, 11, 23, 39, 59, [83]
+8 +12 +16 +20 +24

98. (a) As,

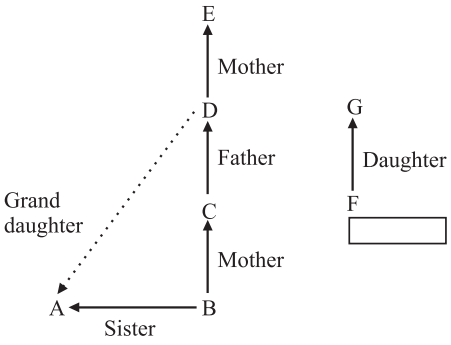
S E L E C T I O N
–2 –2 –2 –2 –2 –2 –2 –2 –2
Q C J C A R G M L

Same as,

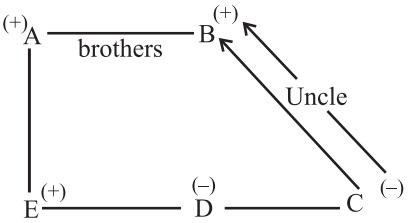
A M E R I C A N S
–2 –2 –2 –2 –2 –2 –2 –2 –2
Y K C P G A Y L Q

99. (c) AB, EDC, FGHI, NMLKJ, OPQRST
Hence, the missing term is NMLKJ

100. (a)



101. (c)



According to diagram, B is the uncle of C.

102. (d) A $\xrightarrow{+1}$ B $\xrightarrow{+2}$ D $\xrightarrow{+3}$ G $\xrightarrow{+4}$
Y $\xrightarrow{-3}$ V $\xrightarrow{-4}$ R $\xrightarrow{-5}$ M $\xrightarrow{-6}$
D $\xrightarrow{+2}$ F $\xrightarrow{+2}$ H $\xrightarrow{+2}$ J $\xrightarrow{+2}$
[K G L]

103. (c) 1, 5, 13, 25, 41, [61]
+4 +8 +12 +16 +20

104. (d) As

1 2 3 4 5 6 7 8 9
H O S P I T A L S
H S O L S A P T I
1 9 2 8 3 7 4 6 5

Similarly,

1 2 3 4 5 6 7 8 9 10 11
B I O L O G I C A L S
B S I L O A L C O I G
1 11 2 10 3 9 4 8 5 7 6

105. (a) Except Lucknow, other three are situated on the bank of River Ganga.

106. (d)

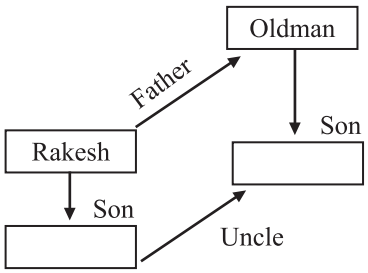
A M N S I P E O C
C I P O A N M E S
C O M P A N I E S
[S E I N C P A M O]

107. (b)

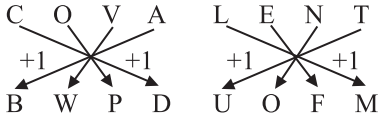
Y $\xrightarrow{-2}$ W $\xrightarrow{-2}$ U $\xrightarrow{-2}$ S $\xrightarrow{-2}$ [Q]
E $\xrightarrow{+1}$ F $\xrightarrow{+2}$ H $\xrightarrow{+3}$ K $\xrightarrow{+4}$ [O]
B $\xrightarrow{+2}$ D $\xrightarrow{+3}$ G $\xrightarrow{+2}$ I $\xrightarrow{+3}$ [L]

108. (c) 1, 4, 27, 16, [125], 36, 343
1^3 2^2 3^3 4^2 5^3 6^2 7^3

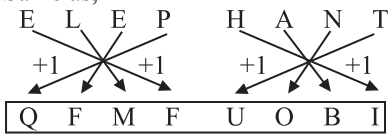
109. (c)



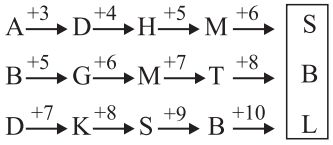
110. (c) As,



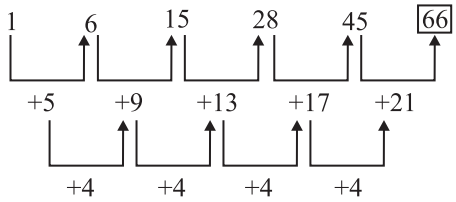
Same as,



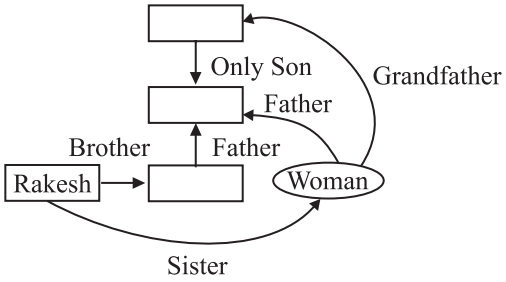
111.(b)



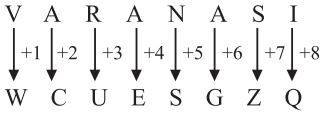
112. (a)



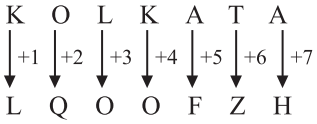
113. (c)



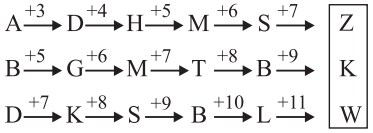
114. (d) As,



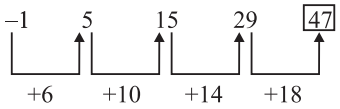
Same as



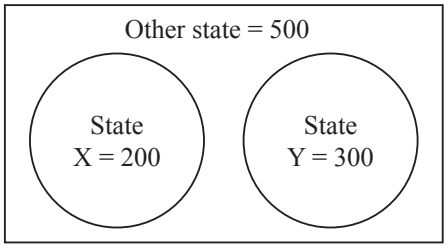
115. (c)



116. (b)



117. (d)



According to the question,

total female students in class = 40% of 1000 = 400

No. of female student in state "X" = 50

No. of female student in State "Y" = 180

The no. of female students from other state in the class

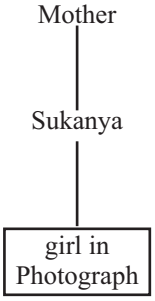
400 – 50 – 180 = 170

118. (d) No. of students from state other than x and y = 500

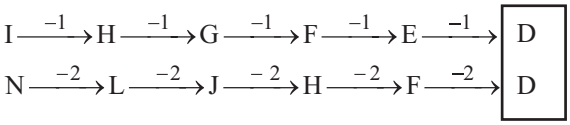
total no. of students = 1000

$$\text{Req \%} = \frac{500}{1000} \times 100 = 50\%$$

119. (c) Sukanya is the mother of that girl.



120. (c)



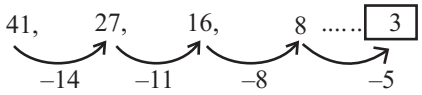
121. (d) As,

F	I	S	T
+4↓	+4↓	+4↓	+4↓
J	M	W	X

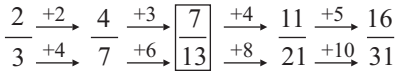
Same as,

B	O	A	T
+4↓	+4↓	+4↓	+4↓
F	S	E	X

122. (a)



123. (d)



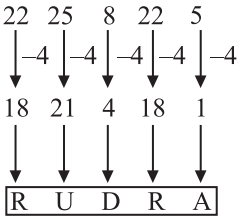
124. (d) A → 5 (1 + 4)

B → 6 (2 + 4)

C → 7 (3 + 4)

D → 8 (4 + 4)

Same as,



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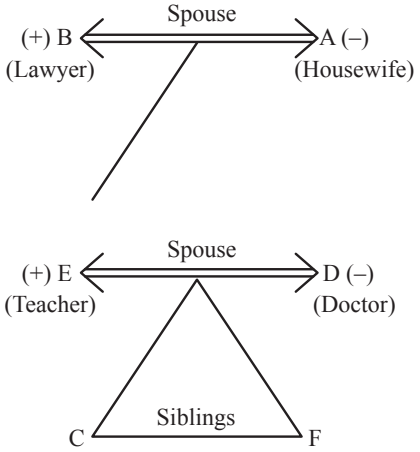
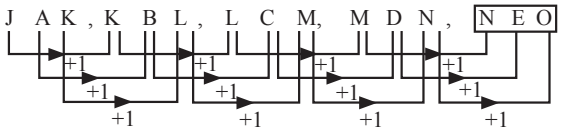
125. (d)



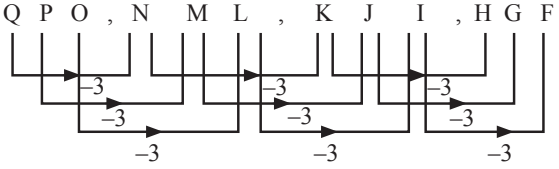
Gender of C and F cannot determine from given question. If C is male, then he is engineer and F is female student and vice-versa.

But in all cases, 'A' is grandmother of 'C'.

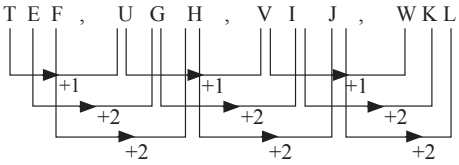
126. (b)



127. (a) The series is:

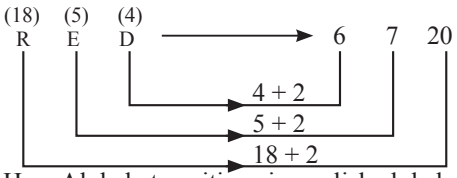


128. (c)



129. (b) The word association/analogy here is of the vessel (cup, bowl) and the consumable liquid (coffee, soup) it generally contains.

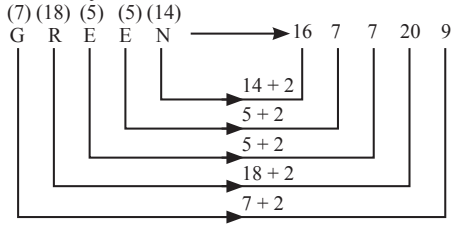
130. (b)



Here Alphabet positions in english alphabets are

$R \rightarrow 18, E \rightarrow 5, D \rightarrow 4$

Similarly



131. (a)

Letter's Position	B A T | | | 2 1 20	2 + 1 + 20 = 23
and	C A T | | | 3 1 20	3 + 1 + 20 = 24
Similarly,	B A L L | | | | 2 1 12 12	2 + 1 + 12 + 12 = 27

132. (d) $E = \frac{(\text{Letter's position})}{1(\text{Number of letter})} = \frac{5}{5} = 1$

$\text{HOTEL} = \frac{8+15+20+5+12}{5} = \frac{60}{5} = 12$

Hence, $\text{BALM} = \frac{2+1+12+13}{4} = \frac{28}{4} = 7$

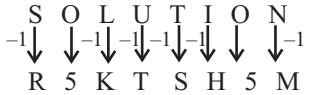
133. (a) DRIVER = 2 × Number of Letters = 2 × 6 = 12

GOVERNMENT = 2 × Number of Letters = 2 × 10 = 20

BELIEVED = 2 × Number of Letters = 2 × 8 = 16

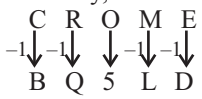
BAT = 2 × Number of Letters = 2 × 3 = 6

134. (c)

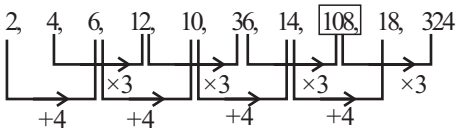


Here, code of letter 'O' is '5

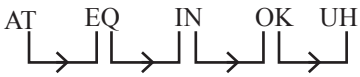
Similarly,



135. (c)



136. (a)



Here, first letter of each term are alphabetical vowel letter.

137. (b) Here code of each letter is a letter which is at same place in reverse order of English alphabet + 1. Position of letter 'E' in English alphabet is '5'.

So, its code letter is at position 5 + 1 = 6th from reverse order of english alphabet.

(5)	(14)	(7)	(12)	(1)	(14)	(4)
E	*N*	*G*	*L*	*A*	*N*	*D*
↓	↓	↓	↓	↓	↓	↓
U	*L*	*S*	*N*	*Y*	*L*	*V*
(6)	(15)	(8)	(13)	(2)	(15)	(5)

Letter position in reverse English alphabet

Similarly

(9)	(18)	(5)	(12)	(1)	(14)	(4)
I	*R*	*E*	*L*	*A*	*N*	*D*
↓	↓	↓	↓	↓	↓	↓
Q	*H*	*U*	*N*	*Y*	*L*	*V*
(10)	(19)	(6)	(13)	(2)	(15)	(5)

Letters position in reverse English alphabet

138. (c) Madhu's husband's brother is Madhu's brother in law.
Hence, Appoorav is Nephew of Madhu's brother in law.

139. (c) Given series is series of prime number
Here, except 63, all others numbers are prime.
Hence, wrong number in the series is 63.

140. (a) 3, 8, 18, 38, [78]
+5×1 +(5×2)+(5×4) +(5×8)
= 5 = 10 = 20 = 40

141. (d) *H P U*
| | |
8 16 21

Letters position in English alphabet
= 18 + 16 + 21 = 45 = 4 + 5 = 9
J N U
| | | = 10 + 14 + 21 = 45
10 14 21
= 4 + 5 = 9
D U
| | = 4 + 21 = 25 = 2 + 5 = 7
4 21

142. (b) (+)*A* — *C*(−)
| |
B (?)
|
(*D*)(+)

Here, *D* is nephew of *B*.

143. (a)
+4 +4 +4
1 D 3, 3 H 5, 5 L 7, 7 P 9
+2 +2 +2 +2

144. (b) Daughter of maternal grandmother of *A* means A's mother is *B*.
Here, As gender of *A* is not clear, so we cannot find the exact relation.
Here *A* can be son/daughter of *B*.
But from given options, option (b) is correct.

145. (c)

C	*R*	*E*	*D*	*I*	*T*
+2↓	−2↓	+2↓	−2↓	+2↓	−2↓
E	*P*	*G*	*B*	*K*	*R*

Similarly,

D	*E*	*B*	*I*	*T*
↓+2	↓−2	↓+2	↓−2	↓+2
F	*C*	*D*	*G*	*V*

146. (a) A E I O U T N H D Z
−1 −1 −1 −1 −1

Similarly,
B F J P V U O I E A
−1 −1 −1 −1 −1

147. (c) The series is like
bb c b b a, b b c b b a , b b c b b a

148. (c) T E A C H E R – T C J A C C V
+2 −2 +2 −2 +2 −2 +2

and
S U R G E O N – P M G E T S U
+2 −2 +2 −2 +2 −2 +2

Similarly,
C O N C O R D – F P Q A P M E
+2 −2 +2 −2 +2 −2 +2

149. (d) Husband of my mother's only daughter is any husband and his wife is mother's in law of that man.

150. (b)
2, 6, 30, 60, 130, 210, [350]
$(1)^3+1$ $(2)^3-2$ $(3)^3+3$ $(4)^3-4$ $(5)^3+5$ $(6)^3-6$ $(7)^3+7$

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151. (d) Bangalore > Jhansi > Rajgarh > Satpura > Chittor

(Largest) (Smallest)

Hence, Chittor is smallest city.

152. (b) Given word is 'REASON'

It's code = (Number of letters in the word – 1) = 5

GOVERNMENT = 9 = (Number of letters in the word – 1)

Similarly, ACCIDENT = 7 = (Number of letters – 1)

153. (d) A is false because communication does include all human behaviour for exchange of information. Human behaviour includes exchange of verbal as well as non-verbal messages.

R is correct, because exchange of verbal as well as non-verbal messages involves the use of all five senses.

154. (c) 4, 12, 42, 168, x

×3 ×3.5 ×4 ×4.5

$\therefore \quad x = 168 \times 4.5 = 756$

155. (a) 2, 9, 20, 35, 54, 77, x

+7 +11 +15 +19 +23 +27

+4 +4 +4 +4 +4

$\therefore \quad x = 77 + 27 = 104$

156. (a) 2, 7, 24, 77, ? = 238, 723

×3+1 ×3+3 ×3+5 ×3+7 ×3+9

? $= 77 \times 3 + 7$

$= 231 + 7$

$= 238$

157. (a) As,

H E A L T H

+3 +3 +3 +3 +3 +3

K H D O W K

Similarly.

N O R T H

+3 +3 +3 +3 +3

Q R U W K

158. (d)

159. (c) An Oar puts a rowboat into motion. A foot puts a skateboard into motion.

CHAPTER 20

Mathematical Aptitude

SIMPLIFICATION

Algebraic expressions contain alphabetic symbols as well as numbers. When an algebraic expression is simplified, an equivalent expression is found that is simpler than the original. This usually means that the simplified expression is smaller than the original.

Bodmas Rule :

This rule depicts the correct sequence in which the operations are to be executed, so as to find out the value of a given expression. Here, 'B' stands for 'Bracket', 'O' for 'of', 'D' for 'Division, 'M' for 'Multiplication', 'A' for 'Addition', 'S' for 'Subtraction'. When an expression contains a vinculum (a horizontal line above an expression), before applying the 'BODMAS' rule, we simplify the expression under the vinculum.

The next step is to evaluate all the expressions in the brackets.

After removing the brackets, we must use the following operations strictly in the following order:

1. of
2. Division, Multiplication
3. Addtition, Subtraction

So, the order of precedence is:

V Vinculum
B Brackets [{(
O Of, Orders (i.e. Powers and Square Roots, etc.)
DM Division and Multiplication (left-to-right)
AS Addition and Subtraction (left-to-right)

SURDS AND INDICES

Mixed surds: If one factor of a surd is a rational number and the other factor is an irrational number, then the surd is called a mixed surd.

Example: $2\sqrt{5}$, $-2\sqrt{3}$

Pure surds: If a surd has unity as its only rational factor, the other factor being an irrational number, then it is called a pure surd.

Examples: $\sqrt{3}, \sqrt{a}$

Since surds are irrational numbers, they can be added or subtracted as real numbers. Also a rational number can be added or subtracted from a surd. The result will be a real number.

Examples: $\sqrt{5}+3;\ 2-\sqrt{7};\ \sqrt{3}-2$

Addition and Subtraction of Surds :

Example: $5\sqrt{2}+20\sqrt{2}-3\sqrt{2}=22\sqrt{2}$

Example: $\sqrt{45}-3\sqrt{20}+4\sqrt{5}=\sqrt{5}$

Multiplying and Dividing Surds :

Surds can be multiplied by using the laws of surds. To multiply or divide Surds they have to first be made of the same order.

Examples: $\sqrt{4}\times\sqrt{22}=\sqrt{88}$, $\sqrt{162}$ $\sqrt{18}=3\sqrt{2}$ / $\sqrt{9}=3\sqrt{2}$

Laws of Indices :

- $a^m \times a^n = a^{m+n}$
- $a^m \div a^n = a^{m-n}$
- $(a^m)^n = a^{mn}$
- $a^{\frac{1}{m}} = \sqrt[m]{a}$
- $a^{-m} = \dfrac{1}{a^m}$
- $a^{m/n} = \sqrt[n]{a^m}$
- $a^0 = 1$

Also, $\left(a^{\frac{1}{n}}\right)^n = a$

$a^{\frac{1}{n}} \cdot b^{\frac{1}{n}} = (ab)^{\frac{1}{n}} \quad \Rightarrow \quad (a^{\frac{1}{n}})^{\frac{1}{m}} = a^{\frac{1}{mn}}$

Examples:

$\sqrt[5]{4^3} = (4^3)^{\frac{1}{5}} = (4^{\frac{3}{5}})$

$5^3 \times 5^4 = 5^7 \quad \Rightarrow \quad \dfrac{5^5}{5^2} = 5^3$

BASIC FORMULAS HELPFUL IN SIMPLIFICATION

$(a+b)^2 = a^2 + 2ab + b^2$

$(a^2 - b^2) = (a-b)(a+b)$

$(a+b)^2 = (a-b)^2 + 4ab$

$(a-b)^2 = (a+b)^2 - 4ab$

$(a-b)^3 = a^3 - b^3 - 3ab(a-b)$

$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$

$(a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$

$x^3 + \dfrac{1}{x^3} = \left(x + \dfrac{1}{x}\right)^3 - 3\left(x + \dfrac{1}{x}\right)$

If $a+b+c=0$, then $a^3 + b^3 + c^3 = 3abc$

$(a-b)^2 = a^2 - 2ab + b^2$

$(a+b)^2 + (a-b)^2 = 2(a^2 + b^2)$

$(a+b)^3 = a^3 + b^3 + 3ab(a+b)$

$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$

$a^3 + b^3 + c^3 - 3abc = (a+b+c)(a^2 + b^2 + c^2 - ab - bc - ac)$

$x^2 + \dfrac{1}{x^2} = \left(x + \dfrac{1}{x}\right)^2 - 2 = \left(x - \dfrac{1}{x}\right)^2 + 2$

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AVERAGE

Average is a general representation of a series. It is calculated by adding a given number of values and then dividing them the number of items. In statistics, average is referred as Arithmetic mean and is denoted by $\bar{X}$.

Hence, Average = $\frac{\text{Sum of elements}}{\text{Number of elements}}$ or $\frac{\sum X}{N}$

Method to Solve Different Questions on Average

- Sum of elements = average × no. of elements

FORMULAS TO REMEMBER

- The average of first n natural numbers = $\frac{n+1}{2}$
- The average of the first n consecutive even numbers = $(n + 1)$
- The average of the first n consecutive odd numbers = n
- The average of the first n odd natural numbers = $\left(\frac{\text{Last odd number} + 1}{2}\right)$
- The average of the first n even numbers = $\left(\frac{\text{Last even number} + 1}{2}\right)$
- The average of the squares of the first n natural numbers can be shown to be = $\frac{1}{6}(n + 1)(2n + 1)$
- The average of the squares of the first n even natural numbers = $\frac{2(n+1)(2n+1)}{3}$
- The average of the squares of the first n odd natural numbers = $\frac{(2n-1)(2n+1)}{3}$
- The average of the cubes of the first n natural numbers = $\frac{n(n+1)^2}{4}$

SIMPLE AND COMPOUND INTEREST

INTEREST

Basic terms associated with this topic:

Interest : It is the time value of money. It is the cost of using capital.

Principal : It is the borrowed amount.

Amount : It is the sum total of Interest and Principal.

Rate : It is the rate percent payable on the amount borrowed.

Period: It is the time for which the principal is borrowed.

Interest can be classified as: Simple interest : Simple Interest is payable on principal.

Compound Interest: Compound Interest is payable on Amount.

Basic formulas related to Simple Interest

- Simple Interest (SI) = $\frac{P \times R \times T}{100}$

  Here P = principal, R = rate per annum, T = time in years

  Amount (A) = $P + \frac{PRT}{100} = P\left(1 + \frac{RT}{100}\right)$ or P + SI

  If time is given in months, & Rate is given per annum, then

  $SI = \frac{P \times R \times T}{12 \times 100}$

  If time is given in weeks, & Rate is given per annum, then

  $SI = \frac{P \times R \times T}{52 \times 100}$

  If time is given in days, & Rate is given per annum, then

  $SI = \frac{P \times R \times T}{365 \times 100}$

- Also,

  Rate $= \frac{SI \times 100}{P \times T}$

  Time $= \frac{SI \times 100}{P \times R}$

  Principal $= \frac{SI \times 100}{R \times T}$

  If amount is given then,

  Principal $= \frac{Amt \times 100}{100 + (R \times T)}$

PERCENTAGE

Percentage in mathematics, means to convert a given fraction to a denominator of 100.

It is often denoted using the percent sign, "%".

For example, 45% (read as "forty-five percent") is equal to 45%

$= \frac{45}{100} = 0.45$

Quicker Methods to Solve the Problems of Percent

- If price of a commodity is increased by x%, the consumption should be reduced, so that the expense remains the same, by $\frac{x}{(100 + x)} \times 100\%$.

PROFIT AND LOSS

This chapter helps you to understand the intricacies of business world and the computation of profit or loss arising out of business transactions.

Various concepts related to this topic are :

Cost Price (CP): It is the price at which the item is procured by the seller.

Selling Price (SP): It is the price at which the item is sold by the seller.

Profit: It is the excess of the selling price over cost price, i.e.

Profit = SP – CP

Loss: It is the excess of cost price over the selling price, i.e.

Loss = CP – SP

Profit Percent: It is profit, expressed as a percentage of cost price, i.e.

$$\text{Profit Percent} = \frac{\text{Profit}}{\text{CP}} \times 100$$

Loss Percent: It is loss, expressed as a percentage of cost price,

$$\text{i.e, Loss Percent} = \frac{\text{Loss}}{\text{CP}} \times 100$$

Note: It should be kept in mind, that both profit and loss percent are calculated on cost price.

Formulas to ascertain cost price or selling price when profit or loss percent are given-

To Find SP when Profit or Loss Percent & CP are given-

- In case Profit percent & CP is given,

$$\text{Then SP} = \left[\frac{100 + \text{Profit}\%}{100}\right] \times \text{CP}.$$

- In case loss percent & CP is given,

$$\text{Then SP} = \left[\frac{100 - \text{Loss}\%}{100}\right] \times \text{CP}.$$

- When selling price and percentage profit are given, then

$$\text{Cost price} = \text{selling price} \left(\frac{100}{100 + \text{profit}\%}\right)$$

To Find CP when profit or loss percent & SP are given-

- In case profit percent & SP is given,

$$\text{Then CP} = \left[\frac{100}{100 + \text{Profit}\%}\right] \times \text{SP}$$

- In case loss percent & SP is given,

$$\text{Then CP} = \left[\frac{100}{100 - \text{Loss}\%}\right] \times \text{SP}$$

Advanced Conditions:

- If two items are sold each at rupees R, one at a gain of x% and other at a loss of x %, there is always an overall loss given by $\frac{x^2}{100}$ % and the value of loss is given by $\frac{2x^2R}{(100^2 - x^2)}$. In case the cost price of both the items is the same and percentage loss and gain are equal, then net loss or profit is zero.

TIME, SPEED AND DISTANCE

This chapter, deals with the following two types of questions :

(i) Time, Speed and Distance

(ii) Boat and Stream

Time, Speed and Distance

Speed:

The distance covered per unit time is called speed. Speed is directly proportional to distance and inversely to time

- Distance = speed × time
- $\text{Speed} = \frac{\text{distance}}{\text{time}}$
- $\text{Time} = \frac{\text{distance}}{\text{speed}}$

Main Units:

- **Time:** Seconds, minutes, hours
- **Distance :** meter, kilometer
- **Speed :** km/hr, m/sec

Conversion
• 1 km/hr $= \frac{5}{18}$ metre/second
• 1 metre/second $= \frac{18}{5}$ km/hr
• 1 Km/hr $= \frac{5}{8}$ mile/hr
• 1 mile/hr $= \frac{22}{15}$ foot/second

RELATIVE SPEED

If two trains are moving in opposite directions with a speed of X km/hr and Y km/hr respectively, then (X + Y) is their relative speed. In the other case if two trains are moving in the same direction with a speed of X km/hr and Y km/hr respectively, then (X – Y) is their relative speed.

For the first case the time taken by the trains in passing each other

$$= \frac{L_1 + L_2}{(X + Y)} \text{ hours,}$$

where L_1 and L_2 are lengths of the trains.

For the second case the time taken by the trains in passing each other

$$= \frac{L_1 + L_2}{(X - Y)} \text{ hours,}$$

where L_1 and L_2 are lengths of the trains.

BOAT AND STREAM

When we move upstream, our speed gets deducted from the speed of the stream. Similarly when we move downstream our speed gets added to the speed of the stream.

Let the speed of a boat in still water be A km/hr and the speed of the stream (or current) be B km/hr, then

– Speed of boat with the stream i.e. speed downstream = (A + B) km/hr

– Speed of boat against the stream i.e. speed upstream = (A – B) km/hr

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- **Boat's speed in still water**
  $= \frac{\text{speed downstream + speed upstream}}{2}$
- **Speed of current**
  $= \frac{\text{Speed downstream – Speed upstream}}{2}$

RATIO AND PROPORTION

Ratio:

Ratio gives us a relation between two quantities having similar unit. The ratio of A to B is written as A : B or $\frac{A}{B}$, where A is called the antecedent and B the consequent.

Proportion :

Proportion is an expression in which two ratios are equal.

For example $\frac{A}{B} = \frac{C}{D}$, $\Rightarrow$ A : B :: C : D

Here, A D = B C

Properties of Ratio & Proportion :

- $a : b = m\,a : m\,b$, where m is a constant
- $a : b : c$ = A : B : C is equivalent to $\frac{a}{A} = \frac{b}{B} = \frac{c}{C}$,
  This is an important property and used in the ratio of three quantities.
  If $a : b = c : d$, i.e
  $\frac{a}{b} = \frac{c}{d}$, then
  $\frac{b}{a} = \frac{d}{c}$, this is the property of Invertendo.
  If $a : b = c : d$, i.e
  $\frac{a}{b} = \frac{c}{d}$, then
  $\frac{a}{c} = \frac{b}{d}$, this is the property of Alternendo.
- If $\frac{a}{b} = \frac{c}{d}$, then $\frac{(a+b)}{b} = \frac{(c+d)}{d}$
  This property is called **Componendo**
  Also,
- $\frac{(a-b)}{b} = \frac{(c-d)}{d}$
  This property is called **Dividendo**
  It also follows that:
- $\frac{(a+b)}{(a-b)} = \frac{(c+d)}{(c-d)}$
  This property is called **Componendo and Dividendo**
- If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} \ldots$, then
  $\frac{(a+c+e+\ldots)}{(b+d+f+\ldots)}$ = each individual ratio i.e. $\frac{a}{b}$ or $\frac{c}{d}$
- If A > B then $\frac{(A+C)}{(B+C)} < \frac{A}{B}$
  Where A, B and C are natural numbers
  In a proportion it should be remembered that-
  Product of means = Product of extremes, i.e. $b \times c = a \times d$.

Types of Proportion

Continued Proportion:

We can say that a, b and c are in continued proportion, if.

$$\frac{a}{b} = \frac{b}{c}$$
$$b^2 = ac \Rightarrow b = \sqrt{ac}$$

Here we can say that a is called first proportion, c is called third proportion and b is called mean proportion.

Also, if two nos. are given, and you are required to find mean proportion, then it should be written as-

$a : x :: x : b$,

And is third proportion is to be computed, then it should be written as-

$a : b :: b : x$.

Direct Proportion: If X is directly proportional to Y, that means any increase or decrease in any of two quantities will have proportionate effect on the other quantity. If X increases then Y will also increase and vice-versa.

Inverse Proportion: If X is inversely proportional to Y, that means any increase or decrease in any of two quantities will have inverse proportionate effect on the other quantity. This means if X increases, then Y decreases and if X decreases then Y increases and vice-versa for Y.

Applications of Ratio and Proportion

Partnership:

To find profit-sharing ratio on the basis of capital contribution.

MIXTURES AND ALLIGATION

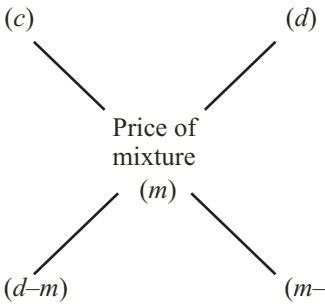
"Mixtures and alligations" is about mixing different qualities of goods in order to get desired levels/percentage/concentration of different objects.

Quicker Method to Solve Questions of Mixture and Alligation.

This rule helps us in solving questions where two varieties (of different prices) are mixed to get a new variety with a new Average price.

$$\frac{\text{Quantity of cheaper variety}}{\text{Quantity of dearer variety}} = \frac{\text{Price of Dearer variety – Average price}}{\text{Average price – Price of cheaper variety}}$$

$$\Rightarrow \frac{c}{d} = \frac{d-m}{m-c}$$



Then, (Cheaper quantity) : (dearer quantity)

$$= (d - m) : (m - c) \Rightarrow \frac{c}{d} = \frac{d-m}{m-c}$$

POINTS TO REMEMBER

- If in a partnership the investments made by first, second and third partners are x_1, x_2, x_3 respectively, the time period be t_1, t_2, t_3 then the ratio of profits is given by $x_1 t_1 : x_2 t_2 : x_3 t_3$.
- If $x_1 : x_2 : x_3$ is the ratio of investments and $P_1 : P_2 : P_3$ be the ratio of Profit then time periods are given by $= \frac{P_1}{x_1} : \frac{P_2}{x_2} : \frac{P_3}{x_3}$
- If $P_1 : P_2 : P_3$ is the ratio of profit on investments and $t_1 : t_2 : t_3$ be the ratio of time periods, then the ratio of investments will be $= \frac{P_1}{t_1} : \frac{P_2}{t_2} : \frac{P_3}{t_3}$

TIME AND WORK

In this chapter we will cover the following two topics they are based on similar concepts.

(i) Time and Work

(ii) Pipes and Cisterns

- Work is the job assigned or job completed. The rate of work is the speed or speed of work.

Quicker Method to solve the Questions of Work and Time

If a person completes a job in n days then he will complete $\frac{1}{n}$ th part in one day.

PIPES AND CISTERNS

Pipes and cisterns problems use the same principles as of time and work. Here a pipe connected with a cistern is called an inlet pipe to fill it or an outlet pipe to empty it.

Quicker Method to solve Questions on Pipes and Cisterns

- If an inlet pipe can fill a cistern in A hours, the part filled in 1 hour = $\frac{1}{A}$ (same as work and time fundamentals)
- If pipe A is 'x' times bigger than pipe B , then pipe A will take $\frac{1}{x^{th}}$ of the time taken by pipe B to fill the cistern.

PERMUTATIONS AND COMBINATIONS

PERMUTATION

Each of the arrangements, which can be made by taking, some or all of a number of things is called a **Permutation**.

For Example : Formation of numbers, word formation, sitting arrangement in a row.

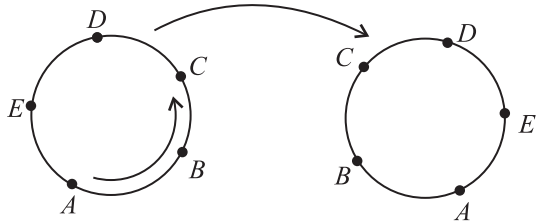
The number of permutations of 'n' things taken 'r' at a time is denoted by ${}^nP_r$. It is defind as, ${}^nP_r = \frac{n!}{(n-r)!}$.

Circular Permutations

(i) Arrangements round a circular table : The number of circular arrangement of n different things taken all at a time = $(n - 1)$!, if clockwise and anticlockwise orders are taken as different.

(ii) Arrangements of beads or flowers (all different) around a circular necklace or garland : Consider five beads A, B, C, D and E in a necklace or five flowers A, B, C, D and E in a garland etc. If the necklace or garland on the left is turned over, we obtain the arrangement on the right, i.e., anticlockwise and clockwise order of arrangements are not different in the case of circular necklace and garland.

Thus the number of circular permutations of 'n' different things taken. all at a time is $\frac{1}{2}(n - 1)!$, if clockwise and anticlockwise orders are taken to be same



Conditional Permutations

1. Number of permutations of n different things taken r at a time, in which a particular thing always occurs = $r \cdot {}^{n-1}P_{r-1}$.

2. Number of permutations of n different things taken r at a time, in which a particular thing never occurs = ${}^{n-1}P_r$.

3. Number of permutations of n different things taking all at a time, in which m specified things always come together = $m!\ (n - m + 1)!$.

4. Number of permutations of n different things taken all at a time, in which m specified things never come together = $n! - m!\ (n - m + 1)!$

COMBINATION

Each of the different selections that can be made from a given number of objects taken some or all of them at a time is called a **Combination**.

The number of combinations of 'n' dissimilar things taken 'r' at a time is denoted by ${}^nC_r$ or $C(n, r)$. It is defined as,

$${}^nC_r = \frac{n!}{r!(n-r)!}$$

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POINTS TO REMEMBER

- ${}^nC_0 = 1,\ {}^nC_n = 1;\ {}^nP_r = r!\ {}^nC_r$
  ${}^nC_r = {}^nC_{n-r}$
- ${}^nC_{r-1} + {}^nC_r = {}^{n+1}C_r$
- ${}^nC_x = {}^nC_y \Rightarrow$ either $x = y$ or $x + y = n$
- ${}^nC_r = \frac{n}{r} \cdot {}^{n-1}C_{r-1}$
- ${}^nC_1 = {}^nC_{n-1} = n$

IMPORTANT RESULTS ABOUT POINTS

1. If there are n non-collinear points in a plane, then
(i) Number of straight lines formed = ${}^nC_2$
(ii) Number of triangles formed = ${}^nC_3$
(iii) Number of quadrilaterals formed = ${}^nC_4$

2. If there are n points in a plane out of which m are collinear, then
(i) Number of straight lines formed = ${}^nC_2 - {}^mC_2 + 1$
(ii) Number of triangles formed = ${}^nC_3 - {}^mC_3$

3. Number of diagonals of a polygon of n sides is ${}^nC_2 - n$ *i.e.*, $\frac{n(n-3)}{2}$

4. Given n points on the circumference of a circle, then
(i) Number of straight lines obtained by joining these n points = ${}^nC_2$
(ii) Number of triangles obtained by joining these n points = ${}^nC_3$
(iii) Number of quadrilaterals obtained by joining these n points = ${}^nC_4$

EXERCISE

1. The number of students in two classes A and B and the respective "mean" of the marks obtained by each of the class are given in the following table : **[December-2004]**

	Class A	Class B
Number of Students	20	80
Arithmatic Mean	10	20

The combined "mean" of the marks of the two classes will be :
(a) 18 (b) 15
(c) 10 (d) 20

2. The sum of a positive number and its reciprocal is twice the difference of the number and its reciprocal. The number is : **[December-2005]**
(a) $\sqrt{2}$ (b) $\frac{1}{\sqrt{2}}$
(c) $\sqrt{3}$ (d) $\frac{1}{\sqrt{3}}$

3. The average of four consecutive even numbers is 27. The largest of these numbers is: **[June-2006]**
(a) 36 (b) 32
(c) 30 (d) 28

4. The sides of a triangle are in the ratio of 1/2 : 1/3 : 1/4. If its perimeter is 52 cm, the length of the smallest side is: **[December-2006]**
(a) 9 cm (b) 10 cm
(c) 11 cm (d) 12 cm

5. Out of four numbers, the average of the first three numbers is thrice the fourth number. If the average of the four numbers is 5, the fourth number is: **[June-2007]**
(a) 4.5 (b) 5
(c) 2 (d) 4

6. If the radius of a circle is increased by 50 per cent. Its area is increased by: **[December-2007]**
(a) 125 per cent (b) 100 per cent
(c) 75 per cent (d) 50 per cent

7. Mary has three children. What is the probability that none of the three children is a boy? **[December-2007]**
(a) 1/2 (b) 1/8
(c) 3/4 (d) 1/4

8. If an article is sold for ₹ 178 at a loss of 11%; what would be its selling price in order to earn a profit of 11%? **[June-2008]**
(a) ₹ 222.50 (b) ₹ 267
(c) ₹ 222 (d) ₹ 220

9. Three individuals X, Y, Z hired a car on a sharing basis and paid ₹ 1,040. They used it for 7, 8, 11 hours, respectively. What are the charges paid by Y? **[December-2009]**
(a) ₹ 290 (b) ₹ 320
(c) ₹ 360 (d) ₹ 440

10. When an error of 1% is made in the length and breadth of a rectangle, the percentage error (%) in the area of a rectangle will be **[December-2009]**
(a) 0 (b) 1
(c) 2 (d) 4

11. When an error of 1% is made in the length of a square, the percentage error in the area of a square will be **[June-2010]**
(a) 0 (b) 1/2
(c) 1 (d) 2

12. In an examination, 35% of the total students failed in Hindi, 45% failed in English and 20% in both. The percentage of those who passed in both subjects is **[December-2010]**
(a) 10 (b) 20
(c) 30 (d) 40

13. A group of 7 members having a majority of boys is to be formed out of 6 boys and 4 girls. The number of ways the group can be formed is **[December-2010]**
(a) 80 (b) 100
(c) 90 (d) 110

14. The price of oil is increased by 25%. If the expenditure is not allowed to increase, the ratio between the reduction in consumption and the original consumption is **[June-2011]**
(a) 1 : 3 (b) 1 : 4
(c) 1 : 5 (d) 1 : 6

15. In a college having 300 students, every student reads 5 newspapers and every newspaper is read by 60 students. The number of newspapers required is **[December-2011]**
(a) at least 30 (b) at most 20
(c) exactly 25 (d) exactly 5

16. How many numbers between 100 and 300 begin or end with 2 ? **[December-2011]**
(a) 100 (b) 110
(c) 120 (d) 180

17. There are 10 lamps in a hall. Each one of them can be switched on independently. The number of ways in which hall can be illuminated is **[December-2011]**
(a) 102 (b) 1023
(c) 210 (d) 10 !

18. If the side of the square increases by 40%, then the area of the square increases by **[December-2011]**
(a) 60 % (b) 40 %
(c) 196 % (d) 96 %

19. Four pipes can fill a reservoir in 15, 20, 30 and 60 hours respectively. The first one was opened at 6 AM, second at 7 AM, third at 8 AM and the fourth at 9 AM. When will the reservoir be filled ? **[June-2012]**
(a) 11 AM (b) 12 Noon
(c) 1 PM (d) 1 : 30 PM

20. The price of petrol increases by 25%. By what percentage must a customer reduce the consumption so that the earlier bill on the petrol does not alter ? **[June-2012]**
(a) 20% (b) 25%
(c) 30% (d) 33.33%

21. The sum of the ages of two persons A and B is 50. 5 years ago, the ratio of their ages was 5/3. The present age of A and B are **[December-2012]**
(a) 30, 20 (b) 35, 15
(c) 38, 12 (d) 40, 10

22. The number of observations in a group is 40. The average of the first 10 members is 4.5 and the average of the remaining 30 members is 3.5. The average of the whole group is **[December-2012]**
(a) 4 (b) 15/2
(c) 15/4 (d) 6

23. If the radius of a circle is increased by 50%, the perimeter of the circle will increase by **[June-2013]**
(a) 20% (b) 30%
(c) 40% (d) 50%

24. The mean of four numbers a, b, c, d is 100. If c = 70, then the mean of the remaining numbers is **[June-2013]**
(a) 30 (b) $\frac{85}{2}$
(c) $\frac{170}{3}$ (d) 110

25. The odd numbers from 1 to 45 which are exactly divisible by 3 are arranged in an ascending order. The number at 6th position is **[June-2013]**
(a) 18 (b) 24
(c) 33 (d) 36

26. In a certain cricket tournament 45 matches were played. Each team played once against each of the other teams. The number of teams participated in the tournament is **[June-2013]**
(a) 8 (b) 10
(c) 12 (d) 14

27. In certain city the Taxi charges comprise of a fixed charge and the charge of the distance travelled. A person paid ₹ 156 for a journey of 16 km and another person paid ₹ 204 for the journey of 24 km. The amount paid by a passenger who has travelled 30 km is **[September-2013]**
(a) 236 (b) 240
(c) 248 (d) 256

28. The world population growth rate at a certain reference year was 3.5%. Assuming exponential growth of population, after how many years, the population of the world would have increased by a factor 16 ? **[September-2013]**
(a) ~ 80 years (b) ~ 40 years
(c) ~ 160 years (d) ~ 320 years

29. Anil is twice as old as Sunita. Three years ago, he was three times as old as Sunita. The present age of Anil is **[December-2013]**
(a) 6 years (b) 8 years
(c) 12 years (d) 16 years

30. The mean marks obtained by a class of 40 students is 65. The mean marks of half of the students is found to be 45. The mean marks of the remaining students is **[December-2013]**
(a) 85 (b) 60
(c) 70 (d) 65

31. A person has to buy both apples and mangoes. The cost of one apple is ₹ 7/- whereas that of a mango is ₹ 5/-. If the person has ₹ 38, the number of apples he can buy is **[December-2013]**
(a) 1 (b) 2
(c) 3 (d) 4

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32. In a post-office, stamps of three different denominations of ₹ 7, ₹ 8, ₹ 10 are available. The exact amount for which one cannot buy stamps is **[June-2014]**

(a) 19 (b) 20
(c) 23 (d) 29

33. The mean of the ages of father and his son is 27 years. After 18 years, father will be twice as old as his son. Their present ages are **[December-2014]**

(a) 42, 12 (b) 40, 14
(c) 30, 24 (d) 36, 18

34. Two numbers are in the ratio 3:5. If 9 is subtracted from the numbers, the ratio becomes 12:23. The numbers are **[December-2014]**

(a) 30, 50 (b) 36, 60
(c) 33, 55 (d) 42, 70

35. At present a person is 4 times older than his son and is 3 years older than his wife. After 3 years the age of the son will be 15 years. The age of the person's wife after 5 years will be; **[June-2015]**

(a) 42 (b) 48
(c) 45 (d) 50

36. A group of 210 students appeared in some test. The mean of $\frac{1}{3}$ rd of students is found to be 60. The mean of the remaining students is found to be 78. The mean of the whole group will be : **[December-2015]**

(a) 80 (b) 76
(c) 74 (d) 72

37. Two railway tickets from city A to B and three tickets from city A to C cost ₹ 177. Three tickets from city A to B and two tickets from city A to C cost ₹ 173. The fare for city B from city A will be ? **[July-2016]**

(a) 25 (b) 27
(c) 30 (d) 33

38. Anil played 8 cricket matches. The mean (average) of the runs was found to be 80. After playing four more matches, the mean of the runs of all the matches was found to be 70. The total runs made in the last four matches is **[August-2016]**

(a) 400 (b) 300
(c) 200 (d) 100

39. At present, a mother is 3 times older than her son. After 5 years, the sum of their ages will be 70 years. The age of the mother after 10 years will be **[August-2016]**

(a) 40 (b) 55
(c) 45 (d) 60

40. Ali buys a glass, a pencil box and a cup and pays ₹ 21 to the shopkeeper. Rakesh buys a cup, two pencil boxes and a glass and pays ₹ 28 to the shopkeeper. Preeti buys two glasses, a cup and two pencil boxes and pays ₹ 35 to the shopkeeper. The cost of 10 cups will be **[January-2017]**

(a) ₹ 40 (b) ₹ 60
(c) ₹ 80 (d) ₹ 70

41. Two numbers are in the ratio 2 : 5. If 16 is added to both the numbers, their ratio becomes 1 : 2. The numbers are : **[July-2018]**

(a) 16, 40 (b) 20, 50
(c) 28, 70 (d) 32, 80

42. On a map, 1 inch represents 250 miles. What is the actual distance between two cities if they are $4\frac{1}{2}$ inches apart on the map? **[20th June 2019-Ist Shift]**

(a) 1100 miles (b) 1125 miles
(c) 1150 miles (d) 1200 miles

43. If the number 345xy is divisible by 90, then (x + y)? **[20th June 2019-Ist Shift]**

(a) 9 (b) 8
(c) 7 (d) 6

44. What will be the ratio of simple interest earned by certain amount at the same rate of interest for 9 years and that for 12 years? **[20th June 2019-Ist Shift]**

(a) 3 : 4 (b) 2 : 3
(c) 4 : 3 (d) Data inadequate

45. If 60% of (a – b) = 40% of (a + b), then what percent of a is b? **[20th June 2019-Ist Shift]**

(a) 20% (b) 25%
(c) 40% (d) 50%

46. The sum of all even natural numbers between 1 and 81 is: **[20th June 2019-IInd Shift]**

(a) 3280 (b) 3321
(c) 1646 (d) 1640

47. In a bag, there are corns of 5 ps, 10 ps and 25 ps in the ratio of 3 : 2 : 1. If there are ₹60 in all, how many 5 ps coins are there? **[20th June 2019-IInd Shift]**

(a) 100 (b) 200
(c) 300 (d) 400

48. Manoj's commission is 10% on all sales up to ₹10,000 and 5% on all sales exceeding this. He remits ₹75,500 to his company after deducting his commission. The total sales will come out to be: **[20th June 2019-IInd Shift]**

(a) ₹78,000 (b) ₹80,000
(c) ₹85,000 (d) ₹90,000

49. The simple interest on a certain sum of money for 3 years at 40 per annum is half the compound interest on ₹2.000 for 2 years at 10% per annum. The sum invested on simple interest is: **[20th June 2019-IInd Shift]**

(a) ₹8,750 (b) ₹1,750
(c) ₹2.500 (d) ₹3500

50. If x and y are two positive numbers and x is 25% greater than y, what is the value of the ratio y/x? **[21st June 2019-Ist Shift]**

(a) 0.75 (b) 0.80
(c) 1.20 (d) 1.25

51. If the simple interest on a certain sum for 1 year 3 months at $8\frac{1}{2}\%$ per annum exceeds the simple interest on the same sum for 8 months at $7\frac{1}{2}\%$ per annum by ₹ 45, then the sum is: **[21st June 2019-Ist Shift]**

(a) ₹ 600 (b) ₹ 800
(c) ₹ 6,000 (d) ₹ 8,000

52. 5% of the inhabitants of a village having died of malaria, a panic set in. During this, 20% of the remaining inhabitants left the village. The population is then reduced to 4750. Find the number of original inhabitants?

[21st June 2019-Ist Shift]

(a) 5000 (b) 5250
(c) 6250 (d) 7500

53. In a class, 20% of the boys have blue eyes and 10% of the girls have blue eyes. If the ratio of boys to girls in the class is 4 : 3, then what is the portion of the students in the class having blue eyes? **[21st June 2019-IInd Shift]**

(a) 12/33 (b) 14/45
(c) 11/45 (d) 11/70

54. The simple interest on a certain sum of money at the rate of 5% p.a. for four years is ₹420. At what rate of interest, the same amount of interest can be received on the same sum after two and half year? [**21st June 2019-IInd Shift]**

(a) 4% (b) 6%
(c) 8% (d) 10%

55. During one year, the population of a town increased by 5% and during the next year, the population decreased by 5%. If the total population is 29925 at the end of the second year, then what was the population size in the begining of the first year? **[21st June 2019-IInd Shift]**

(a) 25000 (b) 30000
(c) 33000 (d) 36000

56. If 152 is divided into four parts proportional to 3, 4, 5 and 7, then the smallest part is: **[24th June 2019-Ist Shift]**

(a) 29 (b) 26
(c) 25 (d) 24

57. For all integers y > 1, <y> = 2y + (2y–1) + (2y – 2) + …. + 1. **[24th June 2019-Ist Shift]**

What is the value of <3> * <2>? where * is a multiplication operator.

(a) 116 (b) 210
(c) 263 (d) 478

58. In a new budget, the price of petrol rose by 25%. By how much percent must a person reduce his consumption so that his expenditure on it does not increase?

[24th June 2019-Ist Shift]

(a) 10% (b) 15%
(c) 20% (d) 25%

59. A sum of money doubles at compound interest in 6 years. In how many years will it become 16 times?

[24th June 2019-Ist Shift]

(a) 16 years (b) 24 years
(c) 48 years (d) 96 years

60. A train leave Agra at 5 a.m. and reaches at Delhi at 9 a.m. Another train leaves Delhi at 7 a.m. and reaches Agra at 10:30 am. At what time do the two trains cross each other?

[26 June 2019-Ist Shift]

(a) 6:36 a.m. (b) 6:56 a.m.
(c) 7 a.m. (d) 7:56 a.m.

61. A trader mixes three varieties of refined oil costing ₹100, ₹40 and ₹60 per litre in the ratio 2 : 4 : 3 in terms of litre, and sells the mixture at ₹66 per litre. What percentage of profit does he make?

[24th June 2019-IInd Shift]

(a) 12% (b) 10% (c) 9% (d) 8%

62. A man travelled from the village to the railway station at the rate of 20 Kmph and walked back at the rate of 5 kmph. If the whole journey took 5 hours, find the distance of the railway station from the village.

[24th June 2019-IInd Shift]

(a) 10 km (b) 15 km
(c) 20 km (d) 40 km

63. If 0.75 x = 0.02 y, then the value of $\left(\frac{y-x}{y+x}\right)$ is:

[24th June 2019-IInd Shift]

(a) 73/75 (b) 75/77
(c) 73/77 (d) 730/75

64. If the average of five numbers is (-20) and the sum of three of the numbers is 32, then what is the average of the other two numbers? **[24th June 2019-IInd Shift]**

(a) (– 66) (b) (– 33)
(c) (– 34) (d) (– 132)

65. A retailer marks all his goods at 40% above the cost price and thinking that he will still make 20% profit, offers a discount of 20% on the marked price. What is his actual profit percentage on the sales? **[25th June 2019-Ist Shift]**

(a) 20% (b) 18%
(c) 16% (d) 12%

66. An aeroplane flies along the four sides of a square field at the speed of 400, 500, 800 and 200 km/hr. Find the average speed of the plane around the field.

[25th June 2019-Ist Shift]

(a) 324 km/hr (b) 360 km/hr
(c) 384 km/hr (d) 390 km/hr

67. A group of 40 employees of Cadre A has a mean age of 31. A different group of 60 employees of Cadre B has a mean age of 28. What is the mean age of two employees of the two groups together? **[25th June 2019-st Shift]**

(a) 29.8 (b) 29.5 (c) 29.2 (d) 29

68. The product of two numbers a and b is twice the sum of the numbers. What is the sum of the reciprocals of a and b?

[25th June 2019-Ist Shift]

(a) 1/8 (b) 1/2 (c) 2 (d) 4

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69. Rohan gave three-fifth of the amount he had, to Sahil. Rohan now has 2000 rupee. How much did he give to Sahil? **[25th June 2019-IInd Shift]**
(a) 1200 rupees (b) 2000 rupees
(c) 3000 rupees (d) 5000 rupees

70. 40% of the employees in a factory are workers. All the remaining employees are executives. The annual income of each worker is ₹ 39,000. The annual income of each executive is ₹ 42,000. What is the average annual income of all employees in the factory together? **[25th June 2019-IInd Shift]**
(a) ₹ 40,500 (b) ₹ 40,800
(c) ₹ 41,000 (d) ₹ 41,500

71. Sameer walks a certain distance and rides back taking a total time of 40 minutes. He could walk both ways in 60 minutes. How long would it take for him to ride both ways? **[25th June 2019-IInd Shift]**
(a) 15 min (b) 20 min (c) 28 min (d) 30 min

72. At, what percentage above the cost price must an article be marked so as to gain 8% after allowing a customer a discount of 10%? **[25th June 2019-IInd Shift]**
(a) 18% (b) 20%
(c) 28% (d) 10.8%

73. The average of 35 raw scores is 18. The average of first seventeen of them is 14 and that of last seventeen is 20. Find the eighteenth raw score. **[26th June 2019-I Shift]**
(a) 42 (b) 46 (c) 52 (d) 56

74. Which of the following fractions is the result of the sum of an integer and its reciprocal? **[26th June 2019-Ist Shift]**
(a) $\frac{15}{8}$ (b) $\frac{26}{5}$ (c) $\frac{36}{7}$ (d) $\frac{37}{5}$

75. Sanjay sold an article at a loss of 25%. If the selling price had been increased by ₹ 175, there would have been a gain of 10%. What was the cost price of the article? **[26th June 2019-Ist Shift]**
(a) ₹ 350 (b) ₹ 400
(c) ₹ 500 (d) ₹ 750

76. A person incurs 10% loss by selling a watch for ₹1,800. At what price should the watch be sold to earn 10% profit? **[26th June 2019-IInd Shift]**
(a) ₹ 1,980 (b) ₹ 2,160
(c) ₹ 2,200 (d) ₹ 2,360

77. The price of item A increases by 50 paise every year while the price of item B increases by 25 paise every year. if in 2008, the price of item A was ₹ 3.20 and that of B was ₹ 5.30, in which year item A will cost 40 paise more than the item B? **[26th June 2019-IInd Shift]**
(a) 2016 (b) 2017
(c) 2018 (d) 2019

78. The average age of a class of 59 students is 18 years. If the age of the teacher is included, then the average increases by 3 months. The age of the teacher is **[26th June 2019-IInd Shift]**
(a) 28 years (b) 30 years
(c) 33 years (d) 35 years

79. Two numbers are in the ratio 3:7. If 8 is added to both the numbers, their ratio becomes 5:9. The numbers are **[2nd Dec. 2019-Ist Shift]**
(a) 12, 28 (b) 6, 14 (c) 15, 35 (d) 24, 56

80. A sum of ₹2,000 yields ₹180 with simple interest in nine (9) months. The annual rate of interest is **[2nd Dec. 2019-Ist Shift]**
(a) 9% (b) 10%
(c) 11% (d) 12%

81. The ratio of two numbers a and b is 3 : 7. After adding 9 to each number, the ratio becomes 9 : 17. The numbers a and b are: **[2nd Dec. 2019-IInd Shift]**
(a) (6, 14) (b) (9, 21)
(c) (15, 35) (d) (18, 42)

82. If $x : y = 7 : 9$, then $3x - 5y : 4x + y = ?$ **[3rd Dec. 2019-Ist Shift]**
(a) $\frac{-24}{37}$ (b) $\frac{-22}{37}$
(c) $\frac{15}{22}$ (d) $\frac{42}{37}$

83. A sum of money with compound interest becomes ₹ 2,400 in one year and ₹ 3,000 in two years. Find out the principal amount. **[3rd Dec. 2019-Ist Shift]**
(a) ₹ 1,900 (b) ₹ 1,910
(c) ₹ 1,915 (d) ₹ 1,920

84. Average of two numbers a and b is 22 and 60% of a = 50% of b. What is the product of a and b? **[3rd Dec. 2019-IInd Shift]**
(a) 160 (b) 384
(c) 480 (d) 484

85. If A is directly proportional to B: B is inversely proportional to C and C is directly proportional to D. then **[3rd Dec. 2019-IInd Shift]**
(A) A is inversely proportional to D
(B) A is directly proportional to D
(C) A is directly proportional to C
(D) A is inversely proportional to C
Choose the correct answer from the options given below:
(a) (A) and (D) (b) (B) only
(c) (A) only (d) (C) and (D)

86. If 3% of $(a + b)$ = 7% of (ab) and 5% of $(a - b)$ = 4% of (ab) then what percentage of b is a? **[4th Dec. 2019-Ist Shift]**
(a) $\frac{47}{23}\%$ (b) $\frac{23}{47}\%$
(c) $\frac{4700}{23}\%$ (d) $\frac{2300}{47}\%$

87. A certain principal invested at compound interest payable yearly amounts to ₹ 10816.00 in 3 years and ₹11248.64 in 4 years. What is the rate of interest?
[4th Dec. 2019-Ist Shift]
(a) 3% (b) 4%
(c) 4.5% (d) 5.5%

88. The sum of a number and its inverse is -4. The sum of their cubes is: **[4th Dec. 2019-Ist Shift]**
(a) –52 (b) 52
(c) 64 (d) –64

89. What is the exact equivalent discount of three successive discounts of 10%, 15% and 20% by Sale of an article?
[4th Dec. 2019-Ist Shift]
(a) 35.8% (b) 38.5%
(c) 35.5% (d) 38.8%

90. Out of a total of 10 students, the average weight of 9 students is 60 kg. If the Weight of the 10 student is 9 kg more than the average weight of all the 10 students, then the weight of 10 student would be : **[4th Dec. 2019-IInd Shift]**
(a) 61 kg. (b) 69 kg.
(c) 70 kg. (d) 71 kg.

91. In what ratio must a vendor mix two varieties of sugar worth ₹ 60 per kg and ₹ 78 per kg so that by selling the mixture at ₹ 78 per kg, the vendor gains 20%?
[4th Dec. 2019-IInd Shift]
(a) 7:4 (b) 7:2
(c) 5:3 (d) 5:2

92. Given below is a question followed by three statements. Identify the statements that are necessary to answer the question. **[4th Dec. 2019-IInd Shift]**
Question: What is the percentage profit gained by a vendor when he sells an article?
Statements:
(i) He gives a 10% discount on the marked price.
(ii) He would have earned 25% profit if he did not give any discount.
(iii) The cost price of the article is ₹ 8000
Choose the correct option from those given below :
(a) (i) and (ii) only (b) (ii) and (iii) only
(c) (i) and (iii) only (d) (i), (ii) and (iii)

93. A solid is in the form of a cylinder with hemispherical ends. The diameter of the cylinder is 1/3 of its height (excluding the hemispherical ends). The total length of the solid including the hemispherical ends is 56 cm. What is the surface area of the solid'? **[5th Dec. 2019-Ist Shift]**
(a) 3080 cm^2 (b) 2464 cm^2
(c) 2772 cm^2 (d) 2156 cm^2

94. The compound interest on a certain sum of money for 3 years at the rate of 10% per annum is ₹ 993.00.The simple interest on the same sum at the rate of 8% per annum for 4 years would be equal to which of the following?
[5th Dec. 2019-Ist Shift]
(a) ₹ 900.00 (b) ₹ 930.00
(c) ₹ 960.00 (d) ₹ 990.00

95. Given below is question (Q) followed by three statements. Identify the statements (A. B. C) that are necessary to answer the question. **[5th Dec. 2019-Ist Shift]**
Question: What is the average age of 30 students studying in a class?
(A) Boys and girls in the class are in the ratio 7:8
(B) The average age of boys and girls is 12.2 years and 11.4 yeais. respectively.
(C) The number of boys in the class is two less than the number of the girls in the class.
Choose the correct option from those given below:
(a) (A) and (B) only
(b) (B) and (C) only
(c) (A) and (0) only
(d) (B) and either (A) or (C)

96. If income of X is 20% more than that of Y and income of Y is 25% less than that of Z, then the total income of X. Y and Z are in which of the following ratios? **[5th Dec. 2019-IInd Shift]**
(a) 18:15:20 (b) 18:15:10
(c) 18:10:15 (d) 18:12:15

97. Three taps A, B and C can fill a tank in 8, 10 and 12 hours respectively. The tap A is open all the time continuously. But taps B and C are open for one hour each alternately. How long will it take the tank to be full?
[5th Dec. 2019-IInd Shift]
(a) 4 hours (b) 4 (16/27) hours
(c) 4(2/3) hours (d) 4(1/3) hours

98. In a class, there are 60% female students and the remaining are male. 40% of the female students and 70% of the male students have opted for the research methodology course. If in all, 60 students have not opted for the research methodology course, which of the following is the total number of students in the class?
[5th Dec. 2019-IInd Shift]
(a) 120 (b) 125 (c) 130 (d) 140

99. Given below is a question followed by three statements. **[5th Dec. 2019-IInd Shift]**
Identify the statement, which is/are necessary to answer the question. 'What is the speed of the train'?
(A) The train crosses another train running in opposite direction in 20 seconds
(B) The train crosses a platform of length 300 m in 30 seconds
(C) The train crosses a pole in 10 seconds
Choose the most appropriate option :
(a) (A) and (B) only (b) (A) and (C) only
(c) (B) and (C) only (d) (A), (B) and (C)

100. A 50 year old man has a son whose age is 2/5 of his age. After how many, the ratio of the age of the man to his son will be 5/3? **[6th Dec. 2019-Ist Shift]**
(a) 10 Years (b) 15 Years

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(c) 20 Years (d) 25 Years

101. The length of the side of a square (5.0cm × 5.0cm) is increased by 1%. By what percentage (%), the area of the square increases? **[6th Dec. 2019-Ist Shift]**

(a) 1% (b) 2%
(c) 5% (d) 4%

102. A person buys 3 items of ₹ 1500 each and 2 items of ₹. 1800 each from a shopping mall. On the total bill a discount of 10% is given. What is the average cost of the items? **[6th Dec. 2019-Ist Shift]**

(a) 1000 (b) 1458
(c) 1658 (d) 1550

103. The smallest integer greater than 1 which is simultaneously a square and a cube of certain **[6th Dec. 2019-Ist Shift]**

(a) 8 (b) 9
(c) 36 (d) 64

104. A student obtains overall 78% marks in his examination consisting of Physics, Chemistry, Mathematics, Computer Science and General English. Marks obtained in each subject and the maximum marks are indicated in the following table.

[6th Dec. 2019-IInd Shift]

Subject	Physics (200 max marks)	Chemistry (100 max marks)	Mathe-matics (200 max marks)	Computer Science (200 max marks)	General English (100 max marks)
Marks Obtained	155	80	165	140	X

The marks (X) obtained by the student in General English would be

(a) 68 (b) 74 (c) 84 (d) 90

105. A circle has the same area as that of a square of diagonal of length 11.0 cm. What is the diameter of the circle?

[6th Dec. 2019-IInd Shift]

(a) ~ 8.7 cm (b) ~ 17.4 cm
(c) ~ 7.8 cm (d) ~ 15.6 cm

106. A shopkeeper sells a refrigerators for ₹ 22,000.00 and makes a profit of 10%. If he desires to make a profit of 18%, what should be his selling price?

[6th Dec. 2019-IInd Shift]

(a) ₹ 23,600 (b) ₹ 39,600
(c) ₹ 36,000 (d) ₹ 24,600

107. The two cities P and Q are 360 km apart from each other. A car goes from P to Q with a speed of 40 km/hr and returns to P with a speed of 60 km/hr. What is the average speed of the car? **[6th Dec. 2019-IInd Shift]**

(a) 45 km/hr (b) 48 km/hr
(c) 50 km/hr (d) 55 km/hr

108. Two cyclists start from the same place in opposite directions. One goes towards north at 9 kmph and the other goes towards south at 10 kmph. What time will they take to be 47.5 km apart? **[6th Dec 2019-IInd Shift]**

(a) $2\frac{1}{2}$ hrs (b) $4\frac{1}{2}$ hrs
(c) $4\frac{1}{4}$ hrs (d) $2\frac{1}{4}$ hrs

HINTS & EXPLANATION

1. **(a)** The combined Mean of the Marks of two classes

$$= \frac{20 \times 10 + 80 \times 20}{20 + 80} = \frac{200 + 1600}{100} = \frac{1800}{100} = 18$$

2. **(c)** Let the positive no. be x.

$$x + \frac{1}{x} = 2\left(x - \frac{1}{x}\right)$$

$$\Rightarrow \frac{x^2 + 1}{x} = 2\left(\frac{x^2 - 1}{x}\right)$$

$$\Rightarrow x^2 + 1 = 2x^2 - 2$$

$$\Rightarrow x^2 = 3$$

$$\therefore x = \sqrt{3}$$

As $x > 0$, $\therefore x \neq \sqrt{3}$.

3. **(c)** Let four consecutive even number,

$$= x, x + 2, x + 4, x + 6,$$

As per question,

$$\frac{x + x + 2 + x + 4 + x + 6}{4} = 27$$

$$4x + 12 = 108$$

$$4x = 108 - 12$$

$$x = \frac{96}{4} = 24$$

So, the largest number = $x + 6 = 24 + 6 = 30$

4. **(d)** Let the sides of the triangle are $\frac{1}{2}x, \frac{1}{3}x$ and $\frac{1}{4}x$

$$\therefore 52 = \frac{1}{2}x + \frac{1}{3}x + \frac{1}{4}x$$

$$= x\left[\frac{1}{2} + \frac{1}{3} + \frac{1}{4}\right] = \frac{13x}{12}$$

$$\Rightarrow 52 = \frac{13x}{12} \Rightarrow x = 48$$

$\therefore$ First side of the triangle = $48 \times \frac{1}{2} = 24$

Second side of the triangle = $48 \times \frac{1}{3} = 16$

Third side of the triangle = $48 \times \frac{1}{4} = 12$ (Smallest side)

5. **(c)** Let the four nos. be x_1, x_2, x_3, and x_4

ATQ $\frac{x_1 + x_2 + x_3}{3} = 3x_4 \Rightarrow x_1 + x_2 + x_3 = 9x_4$ ...(1)

also $\frac{x_1+x_2+x_3+x_4}{4} = 5 \Rightarrow x_1+x_2+x_3+x_4 = 20$ ...(2)

From eqn (1) and (2)

$10x_4 = 20 \Rightarrow x_4 = 2$

$\therefore$ the fourth number = 2.

6. **(a)** Per cent increase in area = $2 \times 50 + \frac{(50)^2}{100}$

$= 100 + \frac{2500}{100}$

$= 100 + 25 = 125\%$

7. **(b)** Total cases for each of the three children (boy or girl in each) = $2 \times 2 \times 2 = 8$ cases

There is only one case in which all 3 are girls. (or none of three is a boy)

So, required probability (none of a boy) = $\frac{1}{8}$

8. **(c)** Required sellings price $= 178 \times \frac{(100+11)}{(100-11)}$

$= 178 \times \frac{2500}{100}$

$= 2 \times 111$

$= ₹\ 222$

9. **(b)** Let Per hour charge of car = ₹ x

$\therefore 7x + 8x + 11x = 1040$

$26x = 1040$

$x = \frac{1040}{26} = 40$

$\therefore$ charges paid by Y = $8 \times 40 = ₹\ 320$

10. **(c)** Percentage error in area of rectangle

$= 1 + 1 + \frac{1\times1}{100}$

$= 2 + \frac{1}{100} = 2 + 0{\cdot}01$

$= 2{\cdot}01 \sim 2\%$

11. **(d)** Percentage error in the area $= 1 + 1 + \frac{1\times1}{100}$

$= 2 + \frac{1}{100} = 2 + 0{\cdot}01$

$= 2{\cdot}01 \simeq 2$

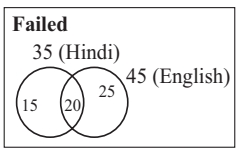
12. **(d)** The percentage of students who passed in both subjects

$= 100 - (35 + 45 - 20)$

$= 100 - (80 - 20)$

$= 100 - 60$

$= 40\%$



13. **(b)** The group must be formed by 4, 5 or 6 boys and 3, 2 or 1 girls

the required number of ways when group formed by 4 boys and 3 girls

Number of ways for this selection

$^6C_4 \times {}^4C_3$

when group formed by 5 boys and 2 girls Number of ways for this selection

$^6C_5 \times {}^4C_2$

when group formed by 6 boys and 1 girl the number of ways for this selection

$^6C_6 \times {}^4C_1$

total number of ways

$= {}^6C_4 \times {}^4C_3 + {}^6C_5 \times {}^4C_2 + {}^6C_6 \times {}^4C_1$

$= 15 \times 4 + 6 \times 6 + 1 \times 4$

$= 60 + 36 + 4 = 100.$

14. **(c)** Let the original price of oil is ₹ 100 per litre,

Price increases by 25%

Then new price = ₹ 125 per litre.

Then price of 1 litre of oil = $\frac{100}{125} = ₹\ \frac{4}{5}$

Reduction in consumption = (1 – 4/5) = 1/5

$\therefore$ Required ratio = $\frac{1}{5} = 1:5$

15. **(c)** Here we suppose group of 5 students as 1 units.

So, number of units = $\frac{300}{60} = 5$ units.

Now, each unit requires sets of papers

Total requirement = $5 \times 5 = \boxed{25}$

16. **(b)** The required numbers are —

Numbers from 200 to 299

And 102, 112, 122, 132, 142, 152, 162, 172, 182, 192

Hence total required number = 100 + 10

= 110

17. **(b)** Since at least one lamp is to be kept Switched on. The total no. of ways = $10c_1 + 10c_2 \ldots\ldots + 10c_{10} = 2^{10} - 1$

$= 1024 - 1 = 1023$

18. **(d)** Let the side of the square be 100 cm.

$\therefore$ Area = side^2 = 10000 cm^2

After increase, side of the square

= 100 + 40

= 140 cm

$\therefore$ Area = $40 \times 140 = 19600$ cm^2

$\therefore$ Percentage increase = $\frac{19600-10000}{10000} \times 100$

$= \frac{9600\times100}{10000} = 96\%$

19. **(c)** Upto 9 A.M. Ist pipe has worked for 3 hrs.

2nd pipe for 2 hrs. and 3rd pipe for 1 hr.

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$\therefore$ Part filled up to 9 A.M.

$$= 3\times\frac{1}{15}+2\times\frac{1}{20}+\frac{1}{30}$$

$$= \frac{1}{5}+\frac{1}{10}+\frac{1}{30}$$

$$= \frac{1}{3}$$

Unfilled part at 9 A.M. $= 1-\frac{1}{3}=\frac{2}{3}$

From 9 A.M. onwards all four pipes are functioning.

Part filled (by all four pipes) in 1 hr.

$$= \frac{1}{30}+\frac{1}{15}+\frac{1}{20}+\frac{1}{60}=\frac{1}{6}$$

$\therefore$ $\frac{2}{3}$ of reservoir will be filled up in $6\times\frac{2}{3}=4$ hr.

Counting 4 hrs. from 9 A.M. reservoir will be full at 1.00 P.M.

20. (a) Let the price of petrol be ₹ 100 per litre. Let the user use 1 litre of petrol. Therefore, his expense on petrol = 100 × 1 = ₹ 100

Now, the price of petrol increases by 25%

Therefore, the new price of petrol = ₹ 125.

As he has to maintain his expenditure on petrol constant, he will be spending only ₹ 100 on petrol.

Let 'x' be the number of litres of petrol he will use at the new price.

Therefore,

$125 \times x = 100$

$\Rightarrow x = \frac{100}{125} = \frac{4}{5} = 0.8$ litre

He has cut down his petrol consumption by

$0{\cdot}2$ litre $= \frac{0{\cdot}2}{1}\times 100 = 20\%$

21. (a) Let present age of A is x and B is y.

According to the question

$$x + y = 50 \qquad \ldots(i)$$

5 years ago, ratio of their age

$$\frac{x-5}{y-5}=\frac{5}{3}$$

$$3(x-5) = 5(y-5)$$

or, $3x - 5y = -10 \qquad \ldots(ii)$

from (i) and (ii)

$$8x = 250 - 10$$

$$x = \frac{240}{8} = 30$$

$$y = 20$$

Present Age of A = 30 years

Present Age of B = 20 years.

22. (c) Observation of first 10 members

$= 4{\cdot}5 \times 10 = 45$

observation of last 30 members

$= 3{\cdot}5 \times 30 = 105$

total observation done by 40 members

$= 45 + 105 = 150$

Average observation of the whole group

$$= \frac{150}{40}=\frac{15}{4}$$

23. (d) Perimeter of circle (p) $= 2\pi r$

when radius (r) increased by 50%

$$r' = r + \frac{r\times 50}{100}=\frac{3r}{2}$$

New Perimeter (p') $= 2\pi r'$

$= 3\pi r$

Increase in perimeter

$$p' - p = 3\pi r - 2\pi r = \pi r$$

Percentage increment $= \frac{\pi r}{2\pi r}\times 100 = 50\%$

24. (d) Mean of four numbers $\frac{a+b+c+d}{4}=100$

or, $a + b + c + d = 400$

or, $a + b + 70 + d = 400$

$a + b + d = 400 - 70 = 330$

Mean $= \frac{a+b+d}{3}=\frac{330}{3}=110.$

25. (c) Odd number from 1 to 45 which are exactly divisible by 3 are following.

3, 9, 15, 21,....., 45

This is an arithmetic series with first term $a = 3$, and common difference $d = 6$

Sixth term of this series

$t_6 = a + (6 - 1).\ d$

$= 3 + 5 \times 6 = 33.$

26. (b) Let number of teams participated in the tournament are n then, number of game played by,

First team = $(n - 1)$

Second team = $(n - 2)$

.....

.....

.....

$(n-1)^{th}$ team = 1

According to the questions,

$(n - 1) + (n - 2) + (n - 3) +.....+ 1 = 45$

This is equivalent to, selection of two 'teams' out of n teams ${}^{n}c_2$

$\therefore$ ${}^{n}c_2 = 45$

$$\frac{n(n-1)}{2}=45$$

or $n(n-1) = 90$

$n^2 - n - 90 = 0$

$(n - 10)(n + 9) = 0$

$\Rightarrow$ $n = 10$

27. **(b)** Let Fixed charge = x

$$\therefore \quad \frac{(156-x)}{16} = \frac{(204-x)}{24}$$

$$\frac{(156-x)}{2} = \frac{(204-x)}{3}$$

$$= 468 - 3x = 408 - 2x$$

$$3x - 2x = 468 - 408$$

$$x = 60$$

$$\therefore \quad \text{Per km change} = \frac{156-60}{16} = \frac{96}{16} = 6$$

$\therefore$ Charges of 30 km = $60 + 30 \times 6$

$= 60 + 180 = 240$

28. **(a)** Exponential growth rate of population calculated by the following formula.

$$P_{(t)} = P_0 e^{rt}$$

where $P_{(t)} = 16P_0$

$r = 3.5\% = .035$

$t = ?$

$e = 2.718$

$16P_0 = P_0 e^{.035}$

$2^4 = e^{.035}$

By taking log,

$4 \log 2 = .035t \log e$

$$4 \times 0.3010 = \frac{3.5}{100} t \times \log 2.718 \ (e = 2{\cdot}718)$$

$$4 \times 0.3010 = \frac{3.5}{100} t \times 0{\cdot}4340$$

$$t = \frac{4 \times 0.3010 \times 100}{3.5 \times 0.4340}$$

$= 79.26$ years or 80 years

29. **(c)** Let the Present Age of Sunita = x years

$\therefore$ Present Age of Anil $= 2x$ years

Now, Age of Sunita before 3 years = $(x - 3)$ years

and Age of Anil before 3 years = $(2x - 3)$ years

According to questions

$2x - 3 = 3(x - 3)$

$\Rightarrow 2x - 3 = 3x - 9$

$\Rightarrow 2x - 3x = -9 + 3$

$\Rightarrow -x = -6$

$\Rightarrow x = 6$

Hence, Present Age of Anil $= 2x$

$= 2 \times 6$

$= 12$ years

30. **(a)** Mean marks of 40 students = 65

$\therefore$ Total marks of 40 students = 65×40

$= 2600$

Again, half of the students i.e.,

Mean marks of 20 students = 45

$\therefore$ Total marks of 20 students = 45×20

$= 900$

$\therefore$ Marks of remaining students = $2600 - 900$

$= 1700$

Hence, marks of 20 students $= 1700$

$\therefore$ Mean marks of 20 students $= \frac{1700}{20} = 85$

31. **(d)** Let, No. of apples = x and No. of Mangoes = y

$7x + 5y = ₹\ 38$

Now, we have to put those numbers in place of x and y so that sum of total is equal to 38.

Hence, if $x = 4$ and $y = 2$. Then

$7 \times 4 + 5 \times 2 = ₹\ 38$

$\Rightarrow 28 + 10 = ₹\ 38$

$38 = ₹\ 38$

No. of apple $= 4$

32. **(a)** A. $19 = 7 \times 2 + 5 = 8 \times 2 + 3$

$= 10 \times 1 + 8 \times 1 + 1$

$= 10 \times 1 + 7 \times 1 + 2$

B. $20 = 10 \times 2 = 20$

C. $23 = 8 \times 2 + 7 \times 1$

$= 16 + 7 = 23$

D. $29 = 7 \times 3 + 8 \times 1$

$= 21 + 8 = 29$

Hence, the exact amount for which one can not buy stamps is 19.

33. **(a)** Let the present age of father is x and the present age of son is y.

As per question.

$(3x - 9) = 2 \times (5x - 9)$

$$\frac{x+y}{2} = 27$$

$x + y = 54$ ...(1)

Again, $x + 18 = 2(y + 18)$

$x + 18 = 2y + 36$

$x - 2y = 18.$ ..(2)

On solving (1) and (2), we get.

$x = 42$

$y = 12$

Hence the present ages are 42 and 12.

34. **(c)** Let the numbers be 3x and 5x.

As per question,

$$\frac{3x-9}{5x-9} = \frac{12}{23}$$

$23 \times (3x - 9) = 12 \times (5x - 9)$

$69x - 207 = 60x - 108$

$9x = 207 - 108 = 99$

$$x = \frac{99}{9}; x = 11$$

Required number's are 33 and 55.

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35. **(d)** After 3 years the age of son will be 15 years, Present age of son = 12 years
Present age of father = $12 \times 4 = 48$
Wife's age = $48 - 3 = 45$
Wife's age after 5 years = $45 + 5 = 50$ years

36. **(d)** $N_1 = \frac{1}{3} \times 210$
$N_1 = 70$
$N_2 = 210 - 70$
$N_2 = 140$
$\therefore \quad \Sigma X_1 = 70 \times 60 = 4200$
$\Sigma X_2 = 140 \times 78 = 10920$
Now, $\Sigma X = 4200 + 10920 = 15120$
Mean of the whole group = $\frac{15120}{210} = 72$

37. **(d)** Let the fare of one ticket from city A to city B = ₹ x
And the fare of one ticket from city A to city C = ₹ y
According to the question :
$3x + 2y = 173$ ....(1)
$2x + 3y = 177$ ....(2)
When equation (1) is multiplied by 3 and equation (2) is multiplied by 2
Then,
$9x + 6y = 519$ ....(3)
$4x + 6y = 354$ ....(4)
Subtracting equation (4) from equation (3)—
$9x + 6y = 519$ ....(3)
$4x + 6y = 354$ ....(4)
$5x = 165$
$\Rightarrow \quad x =$ ₹ 33
Hence, the fare for city B from city A will ₹ 33.

38. **(c)** Average of first 8 matches = 80
$\therefore$ Total runs of 8 matches = $8 \times 80 = 640$
after playing 4 more matches.
Total runs of 12 matches = $12 \times 70 = 840$
$\therefore$ total runs made in the last four matches
$= 840 - 640 = 200$.

39. **(b)** Let the present age of son = x
Mother age = 3x
after 5 years,
$x + 5 + 3x + 5 = 70$
$4x + 10 = 70$
$4x = 60, x = 15$
$\therefore$ Son present age = 15 years
Mother present age = $15 \times 3 = 45$ yrs
Age of mother after 10 yrs =
$45 + 10 = 55$ years

40. **(d)** As per question.
$G + P + C = 21$ ....(i)
$G + 2P + C = 28$ ...(ii)
$2G + 2P + C = 35$ ... (iii)
On solving equations (i), (ii) and (iii),
$G = 7, P = 7, C = 7$
$\therefore$ Cost of 10 cups = $10 \times 7 =$ ₹ 70

41. **(d)** Let the numbers be $2x$ and $5x$
$\frac{2x+16}{5x+16} = \frac{1}{2}$
$4x + 32 = 5x + 16$
$5x - 4x = 32 - 16$
$x = 16$
$\therefore$ Numbers are 32 and 80

42. **(b)** 1 inch = 250 miles
$4\frac{1}{2}$ inch = 4.5 inch = $4.5 \times 250 = 1125$ miles

43. **(d)** Any number, that is divisible by 90, must be divisible by 9 and 10.
Now, for divisibility by 10, last digit of that number must be '0'. And for divisibility by 9 sum of digits of that number must be divisible by 9.
Here given number is $345xy$
To divisible by 10, y = 0
To divisible by 9, $(3 + 4 + 5 + x + 0)$ must be a multiple of 9.
$\therefore \quad 12 + x = 9 \times 2$
$x = 18 - 12 = 6$
Hence, $x + y = 6 + 0 = 6$.

44. **(a)** Let the amount is P and rate of interest is r.
then, S.I. for time 9 years = $\frac{P.r.9}{100}$
S.I. for time 12 years = $\frac{P.r.12}{100}$
Required ratio = $\frac{\frac{P.r.9}{100}}{\frac{P.r.12}{100}} = \frac{9}{12} = \frac{3}{4}$

45. **(a)** From question,
60% of $(a - b)$ = 40% of $(a + b)$
$\frac{60}{100}(a-b) = \frac{40}{100}(a+b)$
$3(a - b) = 2(a + b)$
Dividing both sides by 'a', we get
$3\left(1-\frac{b}{a}\right) = 2\left(1+\frac{b}{a}\right)$
$(3 - 2) = (2 + 3)\frac{b}{a}$
$\frac{b}{a} = \frac{1}{5}$
$\Rightarrow \frac{b}{a} \times 100 = \frac{1}{5} \times 100 = 20\%$

46. **(d)** Even number between 1 to 81 are 2, 4, 6, 8, ... 78, 80.

Number of even number between 1 to 81

$= \frac{81-1}{2} = \frac{80}{2} = 40$

Sum of all even numbers $= \frac{n}{2}[a+b]$

where,

n = number of numbers = 40

a = first number = 2

b = last number = 80

$\therefore$ Sum $= \frac{40}{2}[2+80]$

$= 20 \times 82 = 1640$

47. **(c)** Let number of 5 Ps, 10 Ps and 25 Ps coins are $3x$, $2x$ and x respectively,

$5 \times 3x + 10 \times 2x + 25x = 60 \times 100$

$15x + 20x + 25x = 6000$

$60x = 6000$

$\Rightarrow x = \frac{6000}{60} = 100$

Number of 5 Ps coins $= 3x = 3 \times 100 = 300$

48. **(b)** Let the total sales of the company = ₹ x

Amount Manoj has remitted = ₹ 75500

Now commission for 10000

$= 10000 \times \frac{10}{100} =$ ₹ 1000

Rest amount = $(x - 10000)$

Commission on rest amount

$= (x - 10000) \times \frac{5}{100}$

According to the question,

$$x - \left[1000 + (x-10000) \times \frac{5}{100}\right] = 75500$$

$$x - \frac{x}{20} - 500 = 75500$$

$$\frac{19x}{20} = 76000$$

$\therefore \quad x = \frac{76000 \times 20}{19} =$ ₹ 80,000

49. **(b)** Let the sum invested on simple interest is ₹ x.

then, S.I. $= \frac{\text{C.I.}}{2}$

$$\frac{x \times 3 \times 4}{100} = \frac{2000}{2}\left[\left(1+\frac{10}{100}\right)^2 - 1\right]$$

$$\frac{12x}{100} = \frac{2000}{2}\left[\left(\frac{11}{10}\right)^2 - 1\right]$$

$$\frac{12x}{100} = \frac{1000}{100}[121-100]$$

$12x = 1000 \times 21$

$x = \frac{1000 \times 21}{12} =$ ₹ 1750

50. **(b)** ATQ, $x = y + \frac{25}{100}y$

$x = y + \frac{y}{4} \quad \Rightarrow \quad x = \frac{5y}{4}$

Now, $\frac{y}{x} = \frac{4}{5} = 0.8$

51. **(b)** Let the Sum is ₹ x.

Time t_1 = 1 year 3 months = $1 + \frac{3}{12} = 1.25$ year.

Time t_2 = 8 months = $\frac{8}{12} = \frac{2}{3} = 0.67$ year

Rate, $r_1 = 8\frac{1}{2}\% = 8.5\%$

Rate, $r_2 = 7\frac{1}{2}\% = 7.5\%$

ATQ,

$$\frac{x \times 1.25 \times 8.5}{100} - \frac{x \times 0.67 \times 7.5}{100} = 45$$

$$\frac{(10.625 - 5.025)x}{100} = 45$$

$5.6x = 45 \times 100$

$x = \frac{45 \times 100}{5.6} \approx$ ₹ 800

52. **(c)** Let the original number of inhabitants in the village is n.

5% of the inhabitants died of malaria.

Remaining $= n - \frac{n \times 5}{100} = \frac{95n}{100}$

20% of the remaining inhabitants left the village

Remaining $= \frac{95n}{100} - \frac{95n}{100} \times \frac{20}{100} = \frac{95n}{100} \times \frac{80}{100}$

ATQ,

$\frac{95n}{100} \times \frac{80}{100} = 4750$; $\frac{19n}{20} \times \frac{4}{5} = 4750$

$\Rightarrow n = \frac{4750 \times 20 \times 5}{19 \times 4} = 6250$

53. **(d)** Let number of boys and girls in the class are $4x$ and $3x$.

then, number of boys have blue eyes

$= 4x \times \frac{20}{100} = \frac{4x}{5}$

Number of girls have blue eyes $= 3x \times \frac{10}{100} = \frac{3x}{10}$

Number of students having blue eyes

$= \frac{4x}{5} + \frac{3x}{10} = \left(\frac{8+3}{10}\right)x = \frac{11x}{10}$

Portion of students having blue eyes

$= \frac{\frac{11x}{10}}{(4x+3x)} = \frac{11x}{10 \times 7x} = \frac{11}{70}$

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54. **(c)** Let the sum is ₹ P.

then $P = \frac{S.I. \times 100}{r \times t} = \frac{420 \times 100}{5 \times 4} = 2100$

Now, rate of interest $r = \frac{S.I. \times 100}{P \times t}$

$= \frac{420 \times 100}{2100 \times 2.5} = 8\%$

55. **(b)** From question, population of the town at the end of 2nd year = 29925

Population of the town at the town of first year

$P \times \left(1 - \frac{5}{100}\right) = 29925$

$P \times (0.95) = 29925$

$P = \frac{29925}{0.95} = 31500$

Population of the town at the beginning of first year

$P \times \left(1 + \frac{5}{100}\right) = 31500$

$P(1.05) = 31500$

$P = \frac{31500}{1.05} = 30000$

56. **(d)** Four parts are $3x$, $4x$, $5x$ and $7x$.

Sum of all parts = 152

$3x + 4x + 5x + 7x = 152$

$19x = 152$

$x = \frac{152}{19} = 8$

Smallest part $3x = 3 \times 8 = 24$.

57. **(b)** $<y> = 2y + (2y - 1) + (2y - 2) + ... + 1$

$<3> = 2 \times 3 + (2 \times 3 - 1) + (2 \times 3 - 2) +$
$(2 \times 3 - 3) + (2 \times 3 - 4) + (2 \times 3 - 5)$
$= 6 + 5 + 4 + 3 + 2 + 1 = 21$

$<2> = 2 \times 2 + (2 \times 2 - 1) + (2 \times 2 - 2)$
$+ (2 \times 2 - 3)$
$= 4 + 3 + 2 + 1 = 10$

$< 3 > \times < 2 > = 21 \times 10 = 210$

58. **(c)** Let the price of 1 litre petrol is ₹ 100

when price increases by 25%

New price of 1 litre petrol = 125

Now, quantity of petrol in ₹ 100

$= \frac{1}{125} \times 100 = \frac{4}{5}$ litre.

Percentage deduction in consumption

$= \left(\frac{1 - \frac{4}{5}}{1}\right) \times 100 = \frac{100}{5} = 20\%$

59. **(b)** When the money double itself, then

Amount (A) = 2P

From formula, $A = P\left(1 + \frac{r}{100}\right)^t$

$2P = P\left(1 + \frac{r}{100}\right)^6$

$\Rightarrow \left(1 + \frac{r}{100}\right)^6 = 2$

To become 16 times,

$\left[\left(1 + \frac{r}{100}\right)^6\right]^4 = 2^4$

$\Rightarrow 16 = \left(1 + \frac{r}{100}\right)^{24}$

Hence, $t = 24$ years.

60. **(d)** Let the distance between Delhi to Agra is d km.

Running time of first train = 9 – 5 = 4 hrs

Running time of second train = 10 : 30 – 7 = 3 : 30 hrs.

Speed of first train = $\frac{d}{4}$ km/hr.

Speed of second train = $\frac{d}{3.5}$ km/hr.

Let the two train meets at time t hours after 7 a.m.

then, $\frac{d}{4}(t + 2) + \frac{d}{3.5}.t = d$

$\frac{(t + 2)}{4} + \frac{t}{3.5} = 1$

$\Rightarrow \frac{(3.5 + 4)}{4 \times 3.5}t + \frac{1}{2} = 1$

$\frac{7.5}{4 \times 3.5}t = 1 - \frac{1}{2}$

$\Rightarrow \frac{7.5}{4 \times 3.5}t = \frac{1}{2}$

$t = \frac{4 \times 3.5}{2 \times 7.5} = \frac{14}{15}$ hours

$= \frac{14}{15} \times 60$ minutes = 56 minutes

Hence, the time at which two trains will meet
= 7 : 56 A.M.

61. **(b)** Total cost price of refined oil

$= 2x \times 100 + 4x \times 40 + 3x \times 60 = 540x$

Total selling price of refined oil

$= 9x \times 66 = 594x$

Profit = $594x - 540x = 54x$

Profit % = $\frac{54x}{540x} \times 100 = 10\%$

62. **(c)** Let the distance of railway station from the village is d km.

then, $\frac{d}{20} + \frac{d}{5} = 5$

$\frac{d + 4d}{20} = 5$

$\Rightarrow \frac{5d}{20} = 5$

$\therefore\ d = \frac{20\times 5}{5} = 20$ km

63. (c) $0.75x = 0.024y$

$\Rightarrow \frac{y}{x} = \frac{0.75}{0.02}$

$\Rightarrow \frac{y}{x} = \frac{75}{2}$

$$\frac{y-x}{y+x} = \frac{\frac{y}{x}-\frac{x}{x}}{\frac{y}{x}+\frac{x}{x}} = \frac{\frac{y}{x}-1}{\frac{y}{x}+1}$$

$$= \frac{\frac{75}{2}-1}{\frac{75}{2}+1} = \frac{75-2}{75+2} = \frac{73}{77}$$

64. (a) Sum of all the five numbers = 5 × (–20) = –100

Sum of three numbers = (32) = 32

Sum of remaining two numbers = –100 – 32 = –132

Average of remaining two numbers = $-\frac{132}{2} = -66$

65. (d) Let the cost price of the article is ₹ x.

then, marks price = $x + \frac{x\times 40}{100}$

$= \frac{(100+40)x}{100} = 1.4x$

Selling price after 20% discount

$= 1.4x \times \left(1-\frac{20}{100}\right)$

$= 1.4x \times \left(\frac{100-20}{100}\right)$

$= 1.4x \times 0.8$

$= 1.12x$

Profit percent = $\left(\frac{1.12x-x}{x}\right)\times 100$

$= 0.12 \times 100 = 12\%$

66. (c) Let the side of square field is d km.

Time to fly = $\frac{d}{400}, \frac{d}{500}, \frac{d}{800}, \frac{d}{200}$

Average speed = $\frac{\text{Total distance travelled}}{\text{Total time taken}}$

$$= \frac{d+d+d+d}{\frac{d}{400}+\frac{d}{500}+\frac{d}{800}+\frac{d}{200}}$$

$$\frac{4\times 2400}{6+4+3+12} = \frac{4\times 2400}{25}$$

$= 384$ km/hr.

67. (c) Total age of 40 employees of cadre A

$= 40 \times 31 = 1240$

Total age of 60 employees of cadre B

$= 60 \times 28 = 1680$

Average age of two cadre

$= \frac{1240+1680}{40+60}$

$= \frac{2920}{100} = 29.2$ years.

68. (b) According to the question,

$a \times b = 2(a + b)$

$\Rightarrow \frac{a\times b}{a+b} = 2$

and $\frac{a+b}{ab} = \frac{1}{2}$

$\frac{a}{ab}+\frac{b}{ab} = \frac{1}{2}$

$\frac{1}{b}+\frac{1}{a} = \frac{1}{2}$

Sum of reciprocal, $\frac{1}{a}+\frac{1}{b} = \frac{1}{2}$

69. (c) Let Rohan had intially ₹ x

Amount gave to Sahil = $\frac{3}{5}$x

Remaining amount $x - \frac{3}{5}x = 2000$

$\frac{2x}{5} = 2000 \Rightarrow x = \frac{2000\times 5}{2}$

Amount gave to Sahil = $\frac{3}{5}x = \frac{3}{5}\times\frac{2000\times 5}{2} =$ ₹ 3000

70. (b) Let the factory have total 100 employees.

No. of workers employees = $100\times\frac{40}{100} = 40$

No. of executive employees = $100\times\frac{60}{100} = 60$

Average annual income

$= \frac{\text{Some of income of all employees}}{\text{Number of employees}}$

$= \frac{39000\times 40+42000\times 60}{40+60}$

$= \frac{(1560+2520)\times 1000}{100} =$ ₹ 40800

71. (b) Let Sameer can walk and rides any vehicle with speed W and R m/min respectively, then for a distance d m.

$\frac{d}{W}+\frac{d}{R} = 40$ (i)

and $\frac{d}{W}+\frac{d}{W} = 60 \Rightarrow \frac{2d}{W} = 60 \Rightarrow \frac{d}{W} = 30$ (ii)

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From (i) and (ii), $30+\frac{d}{R}=40 \Rightarrow \frac{d}{R}=10$

When Sameer rides both way, then

$\frac{d}{R}+\frac{d}{R}=2\left(\frac{d}{R}\right)=10\times2=20\text{ min}$

72. **(b)** Let cost price of an article is ₹ 100 to get a profit of 8%

Selling price $=100\times\left(\frac{100+8}{100}\right)=$ ₹ 108

Now, discount = 10%

∴ Marked price

$=\text{Selling price}\times\frac{100}{(100-\text{Discount}\,\%)}$

$=108\times\frac{100}{(100-10)}=108\times\frac{100}{90}=$ ₹ 120

Required percent $=\left(\frac{120-100}{100}\right)\times100=20\%$

73. **(c)** Sum of scores of all 35 raw scores

$= 35 \times 18 = 630$

Sum of scores of first seventeen

$= 17 \times 14 = 238$

Sum of scores of last seventeen

$= 17 \times 20 = 340$

Hence, eighteenth raw score

$= -238 - 340 + 630 = 52$

74. **(b)** Let the number is n, then its reciprocal is $\frac{1}{n}$

Now, the sum of the numbers = $-=\frac{n^2+1}{n}$

Now, from the options (a), when denominator $n = 8$ then, numerator should be

$(n)^2 + 1 = (8)^2 + 1 = 65$

Option (b) when denominator $n = 5$

then, numerator should be $n^2 + 1 = 5^2 + 1 = 26$.

Hence, fraction is $\frac{26}{5}$.

75. **(c)** Let the cost price of the article is ₹ x.

Selling price of the article $= x - \frac{25x}{100} = 0.75x$

When selling price is $(0.75x + 175)$

then cost price $= (0.75x + 175) \times \frac{100}{(100+10)}$

$= (0.75x + 175) \times \frac{10}{11}$

ATQ, $(0.75x + 175) \times \frac{10}{11} = x$

$7.5x + 1750 = 11x$

$(11 - 7.5)x = 1750$

$x = \frac{1750}{3.5} =$ ₹ 500

76. **(c)** Selling price of the watch = ₹ 1800

Loss % = 10%

Cost price = Selling price $\times \frac{100}{(100-\text{loss}\,\%)}$

$= 1800 \times \frac{100}{(100-10)}=1800\times\frac{100}{90}=2000$

to get a profit of 10%

selling price = Cost price $\times \left(\frac{100+\text{Profit}\,\%}{100}\right)$

$=2000\times\left(\frac{100+10}{100}\right)$

= ₹ 2200

77. **(c)** Let after n years , difference in price of item A and item B is 40 paise.

Price of item A after n years.

= 3.20 + 0.5n .

Price of item B after n years

= 5.30 + 0.25 n

According to the question,

= 3.2 + 0.5n – (5.3 + 0.25 n) = 0.4

0.5n – 0.25n = 0.4 + 5.3 – 3.2

0.25n = 2.5

$n = \frac{2.5}{0.25}=10$

10 years after 2008 is 2018

78. **(c)** Teacher's age $=\left(18+\frac{3}{12}\right)\times60-18\times59$

$= 18.25 \times 60 - 18 \times 59$

$= 1095 - 1062$

= 33 Years.

79. **(a)** Let two numbers are $3x$ and $7x$ respectively

According to the question,

$\frac{3x+8}{7x+8}=\frac{5}{9}$

$9(3x + 8) = 5(7x + 8)$

$27x + 72 = 35x + 40$

$35x - 27x = 72 - 40$

$8x = 32 \quad \Rightarrow x = 4$

Hence, numbers are $(3 \times 4, 7 \times 4) = (12, 28)$

80. **(d)** Sum = ₹2000, Simple interest = ₹180

Time = 9 months = $\frac{9}{12}$ years, Interest rate = ?

S.I. $=\frac{\text{Sum}\times\text{time}\times\text{rate}}{100}$

$\Rightarrow \frac{2000\times\frac{9}{12}\times\text{rate}}{100}=180$

$\therefore$ rate $=\frac{180\times100}{2000\times\frac{9}{12}}=12\%$

81. **(d)** According to the question

$\frac{a}{b} = \frac{3x}{7x} \Rightarrow a = 3x$ and $b = 7x$

and $\frac{a+9}{b+9} = \frac{9}{17} \Rightarrow \frac{3x+9}{7x+9} = \frac{9}{17}$

$17(3x + 9) = 9(7x + 9)$

$51x + 153 = 63x + 81$

$63x - 51x = 153 - 81$

$12x = 72$

$x = 6$

Now $a = 3x = 3 \times 6 = 18$

$b = 7x = 7 \times 6 = 42$

$\therefore (a, b) = (18, 42)$

82. **(a)** $\frac{x}{y} = \frac{7}{9}$

Then, $\frac{3x-5y}{4x+y} = \frac{3\left(\frac{x}{y}\right)-5}{4\left(\frac{x}{y}\right)+1} = \frac{3\left(\frac{7}{9}\right)-5}{4\left(\frac{7}{9}\right)+1}$

$\frac{\frac{7}{3}-5}{\frac{28}{9}+1} = \frac{\{7-5\times3\}}{3(28+9)}$

$= \frac{3(7-15)}{37} = \frac{-3\times8}{37} = \frac{-24}{37}$

83. **(d)** Let the principal amount = ₹ P

and rate of interest = r%

$\frac{\text{Amount in 2 years}}{\text{Amount in 1 years}} = \frac{P\left(1+\frac{r}{100}\right)^2}{P\left(1+\frac{r}{100}\right)^1}$

$\frac{3000}{2400} = \left(1+\frac{r}{100}\right)$

$1+\frac{r}{100} = \frac{5}{4}$

$\frac{r}{100} = \frac{5}{4} - 1 = \frac{5-4}{4} = \frac{1}{4}$

$r = \frac{1}{4}\times100 = 25\%$

Now, $2400 = P\left(1+\frac{25}{100}\right)^1$

$\Rightarrow 2400 = P\left(\frac{5}{4}\right)$

$P = 2400\times\frac{(4)}{(5)} = ₹1920$

84. **(c)** Average of two numbers = 22

$\frac{a+b}{2} = 22$

$a + b = 44$ ...(i)

According to the question,

$a\times\frac{60}{100} = b\times\frac{50}{100}$

$6a = 5b \Rightarrow b = \frac{6a}{5}$

Putting value of b in equation (i), we have

$a+\frac{6a}{5} = 44$

$\frac{5a+6a}{5} = 44 \Rightarrow a = \frac{44\times5}{11} = 20$

$b = 44 - 20 = 24$

Product = $a \times b = 20 \times 24 = 480$

85. **(a)** According to the question;

$A \propto B$ and $B \propto \frac{1}{C}$ and C∝D

$\Rightarrow A = K_1B$ and $B = \frac{K_2}{C}$ and $C = K_3D$

$A = \frac{K_1K_2}{C} \Rightarrow A \propto \frac{1}{C}$

and $A = \frac{K_1K_2}{K_3D} \Rightarrow A \propto \frac{1}{D}$

Hence (A) and (D) are correct.

86. **(c)** 3% of (a + b) = 7% of (ab)

$\Rightarrow$ 3(a +b) = 7ab (i)

and, 5% of (a –b) = 4% of (ab)

$\Rightarrow$ 5(a – b) = 4ab (ii)

From equation (i) and (ii) we have.

12(a + b) = 28 ab

and 35(a – b) = 28 ab

$\Rightarrow$ 12(a + b) = 35 (a – b)

(35 – 12)a = (35 + 12)b.

$\frac{a}{b} = \frac{47}{23}$

Now, Let x% of b = a

Then $\frac{x}{100}\times b = a \Rightarrow n+\frac{1}{n} = -4 = \frac{47}{23}\times100$

$= \frac{4700}{23}\%$

87. **(b)** Let rate of interest is r %

Now, Amount = $P\left(1+\frac{r}{100}\right)^t$

$\therefore \quad 11248.64 = P\left(1+\frac{r}{100}\right)^4$ ...(i)

and $10816 = P\left(1+\frac{r}{100}\right)^3$ ...(ii)

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from (i) and (ii), we get.

$$\left(1+\frac{r}{100}\right)=\frac{11248.64}{10816}=1.04$$

$$\frac{r}{100}=0.04 \Rightarrow r=4\%$$

88 **(a)** Let number is n.

Then, ATQ, $n+\frac{1}{n}=-4$

Now, $\left(n+\frac{1}{n}\right)^2=n^2+\frac{1}{n^2}+2$

$$(-4)^2=n^2+\frac{1}{n^2}+2$$

$$n^2+\frac{1}{n^2}=14$$

Sum of its cube

$$\Rightarrow\ n^3+\frac{1}{n^3}=\left(n+\frac{1}{n}\right)\left(n^2+\frac{1}{n^2}-1\right)$$

$= (-4)(14-1) = -52.$

89. **(d)** Let original number is 100.

Then, number after first discount

$$= 100\times\left(\frac{100-10}{100}\right)=90.$$

number after second discount

$$= 90\times\frac{(100-15)}{100}=76.5$$

number after third discount

$$= 76.5\times\left(\frac{100-20}{100}\right)=61.2$$

Equivalent discount = 100 – 61.2 = 38.8%

Trick: $100\left[1-\left(\frac{1-10}{100}\right)\left(\frac{1-15}{100}\right)\left(\frac{1-20}{100}\right)\right]=38.8\%$

90. **(c)** Let weight of 10^{th} student = x kg

Average weight of 9 students = 60 kg

total weight of 9 students = 9 × 60 = 540 kg

Now, Average weight of 10 students

$$=\left(\frac{540+x}{10}\right)$$

According to the question,

$$x-\left(\frac{540+x}{10}\right)=9$$

$10x - 540 - x = 90$

$9x = 90 + 540 = 630$

$$x=\frac{630}{9}=70 \text{ kg.}$$

91. **(b)** Let two varieties of Sugar mixed in $x : y$ ratio

Total cost price = $x \times 60 + y \times 78$

$= (60x + 78y)$

Total selling price = $(x + y) \times 76.8$

$= 76.8\ (x + y)$

Gain = 20% {Given}

$$\therefore\ (60x+78y)\times\left(1+\frac{20}{100}\right)=76.8(x+y)$$

$$(60x+78y)\times\frac{6}{5}=76.8(x+y)$$

$360x + 468y = 384\ (x + y)$

$384x - 360x = 468y - 384y$

$24x = 84y$

$\therefore\ x : y = 84 : 24$

$\Rightarrow x : y = 7 : 2$

92. **(a)** From (i) and (ii)

Let cost price is ₹100

then selling price = marked price = 125

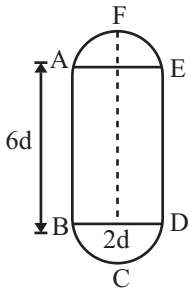
Now, discount = 10% {From (i)}

Then, selling price = $125\times\left(1-\frac{10}{100}\right)$

$= 125 \times 0.9 = 112.5$

So, profit % = $\left(\frac{112.5-100}{100}\right)\times 100 = 12.5\%$

93. **(b)** Let $ABCDEF$ is a cylinder with hemispherical ends.



Diameter of the cylinder $BD = 2d$

height of the cylinder $AB = 6d$

total length = $6d + d + d = 56$

$8d = 56$

$d = 7$ cm.

Surface area of the solid

= Surface area of cylindrical parts

+ 2 × surface area of hemisphere

$= 2\pi \times d \times 6d + 2 \times 2\pi\ (d)^2$

$= 12\pi d^2 + 4\pi d^2 = 16\pi d^2$

$$= 16\times\frac{22}{7}\times(7)^2 = 2464 \text{ cm}^2$$

94. **(c)** C.I. $= P\left[\left(1+\frac{r}{100}\right)^3-1\right]$

$$993 = P\left[\left(1+\frac{10}{100}\right)^3-1\right]$$

$993 = P\ [1.331 - 1]$

$\Rightarrow 993 = (0.331)P$

$P = \frac{993}{0.331} = 3000$

Now, simple interest (S.I.) = $\frac{Prt}{100}$

$= \frac{3000 \times 8 \times 4}{100} = 960$

95. (d)

(A) Number of boys and girls are 7x and 8x respectively.

(B) Average age of boys = 12.2 years.

Average age of girls = 11.4 years.

(C) Number of girl – Number of boy = 2

From (A) and (C)

$8x - 7x = 2 \Rightarrow x = 2.$

$\therefore$ Number of boys = 7x = 14

Number of girls = 8x = 16

From (B), Sum of age of all boys.

$= 12.2 \times 14 = 170.8$

Sum of age of all girls

$= 16 \times 11.4 = 182.4$

$\therefore$ Average age of 30 students

$= \frac{170.8 + 182.4}{30} = 11.77 \text{ year}$

Hence, statement either (A) are (C) and (B) are required

96. (a) Let income of z is P

Then income of y = $P \times \left(\frac{100 - 25}{100}\right) = 0.75P$

Income of $x = 0.75P \times \left(1 + \frac{20}{100}\right) = 0.9P$

Ratio of incomes of X : Y and Z

= 0.9 : 0.75 : 1

= 18 : 15 : 20

97. (b) Part of the tank filled in first hour by tap A and $B = \frac{1}{8} + \frac{1}{10} = \frac{9}{40}$ tank

Part of the tank filled in second hour by tap A and $C = \frac{1}{8} + \frac{1}{12} = \frac{5}{24}$

Part of the tank filled in 2 hours

$= \frac{9}{40} + \frac{5}{24} = \frac{26}{60}$ tank

Part of the tank remains empty after 4 hours

$= 1 - 8 \times \frac{26}{60} = \frac{2}{15}$ tank

Time required to fill $\frac{2}{15}$ tank by tap A and B

$= \frac{2}{15} \times \frac{40}{9} = \frac{16}{27}$ hour

Hence, total time taken

$= 4 + \frac{16}{27} = 4\frac{16}{27}$ hours

98. (b) Percent of male students = (100 – 60) = 40%

Let total number of students in the class = x

Now, number of students who have not opted for the research methodology course = 60.

$\therefore \; x \times \frac{40}{100} \times \left(\frac{100 - 70}{100}\right) + x \times \frac{60}{100} \times \left(\frac{100 - 40}{100}\right) = 60$

$0.12x + 0.36x = 60$

$x = \frac{60}{0.48} = 125.$

99. (c) Let the length of one train is 'l'

Then from statement (c);

Time to cross a pole = 10 sec

$\therefore$ Speed of the train = $\frac{\ell}{10}$ ...(i)

from statement (b).

Length of the platform = 300m

and time to cross the platform =30 sec.

$\therefore$ Speed of the train

$= \frac{\ell + 300}{30}$ ...(ii)

From (i) and (ii) an here $\frac{\ell}{10} = \frac{\ell + 300}{30}$

$3\ell = \ell + 300 \Rightarrow \ell = 150$m

$\therefore$ Speed of the train = $\frac{\ell}{10} = \frac{150}{10} = 15$ m/sec.

Hence, statement (B) and (C) are enough to given the answer

100. (d) Mom's age = 50 years

Son's age = $\frac{2}{5} \times 50 = 20$ years

Let after x year, the ratio of their age becomes 5 : 3.

Then, $\frac{50 + x}{20 + x} = \frac{5}{3}$

$\Rightarrow \quad 3(50 + x) = 5(20 + x)$

$\Rightarrow \quad 150 + 3x = 100 + 5x$

$\Rightarrow \quad 5x - 3x = 150 - 100$

$\Rightarrow \quad 2x = 50$

$\Rightarrow \quad x = \frac{50}{2} = 25$ years

101. (b) Area of the square = $5 \times 5 = 25$ cm^2

When length is increases by 1%.

Then, length of the square

$= 5 + \frac{5 \times 1}{100} = 5.05$ cm

Area of new square = (5.05) × (5.05)

= 25.5025 cm^2

Increase in area = 25.5025 – 25 = 0.5025

Percentage increase in area = $\frac{0.5025}{25} \times 100 = 2\%$

102. (b) Total cost of 3 items at the rate of ₹1500 each

= 3 × 1500 = ₹4500

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Total cost of 2 items at the rate of ₹1800 each
$= 2 \times 1800 = ₹3600$
Total cost of 5 items = 4500 + 3600 = ₹8100
Discount = 10%

Net cost = $8100 \times \left(\frac{100-10}{100}\right) = ₹7290$

Average cost of the item = $\frac{7290}{5} = ₹1458$

103. (d) Let the number 'k' is cube of number x and square of number $(x + y)$.

Then, $k = x^3$ ...(i)

$k = (x + y)^2$ ...(ii)

Here, $1 \le (x, y) < \frac{k}{2}$

From (i) and (ii),

$x^3 = (x + y)^2$

$x^3 = x^2 + y^2 + 2xy$

$x^3 - x^2 = y^2 + 2xy$

$x^2(x - 1) = y(y + 2x)$

For $x = 2$, $2^2(2 - 1) = y(y + 4)$

This is not valid for any integer value of y.

For $x = 3$, $3^2(3 - 1) = y(y + 6)$

$18 = y(y + 6)$

This is not valid for any integer value of y.

For $x = 4$, $4^2(4 - 1) = y(y + 8)$

$48 = y(y + 8)$

$48 = 4(4 + 8) = 48$

Thus $x = 4$, and $y = 4$

Hence, Number $k = (x)^3 = (4)^3 = 64$.

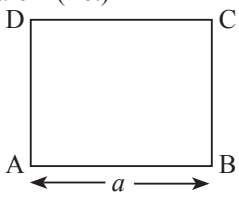
104. (c) Total maximum marks
$= 200 + 100 + 200 + 200 + 100 = 800$
Overall marks percentage = 78%

Overall marks = $800 \times \frac{78}{100} = 624$

Total marks obtained
$= 155 + 80 + 165 + 140 + x = 540 + x$
Now, $540 + x = 624$

$x = 624 - 540 = 84$

105. (a) Let the diagonal of the square ABCD is AC = 11 cm
Side AB = a cm (Let)



Diagonal AC = $\sqrt{AB^2 + BC^2}$

$= \sqrt{(AB)^2 + (AB)^2}$ {$\because$ ABCD is a square}

$= \sqrt{2} \cdot AB = \sqrt{2} \cdot a$

Now, $\sqrt{2} \cdot a = 11$

$a = \frac{11}{\sqrt{2}}$

Area of the square = $(AB)^2 = a^2 = \left(\frac{11}{\sqrt{2}}\right)^2 = \frac{121}{2}$

Area of the circle with diameter 'd' = $\pi \cdot \left(\frac{d}{2}\right)^2$

According to the question,
Area of square = Area of the circle

$\pi\left(\frac{d}{2}\right)^2 = \frac{121}{2}$

$\pi \cdot d^2 = 121 \times 2$

$d^2 = \frac{121 \times 2}{\pi} = \frac{121 \times 2 \times 7}{22}$

$d = \sqrt{11 \times 7} \approx 8.7$ cm

106. (a) Selling price = ₹22,000
Profit % = 10%

Cost price = Selling price $\times \frac{100}{(100 + \text{Profit \%})}$

$= 22000 \times \frac{100}{(100+10)}$

$= 22000 \times \frac{100}{110} = ₹20,000$

Now, desired profit % = 18%

Selling price = Cost price $\times \frac{(100 + \text{Profit \%})}{100}$

$= 20000 \times \frac{(100+18)}{100} = ₹23,600$

107. (b) Average Speed = $\frac{\text{Total Distance Covered}}{\text{Total time taken}}$

Time taken to go from P to Q

$t_1 = \frac{360}{40} = 9$ hours

Time taken to come back from Q to P

$t_2 = \frac{360}{60} = 6$ hours

Average Speed = $\frac{360+360}{9+6} = \frac{720}{15} = 48$ km/hr.

108. (a) As two cyclist are moving in opposite direction, so, their relative speed

$= 9 + 10 = 19$ km/hr

Now, Required time = $\frac{47.5}{19} = 2.5$ hrs $= 2\frac{1}{2}$ hrs

CHAPTER 21

Understanding the Structure of Arguments

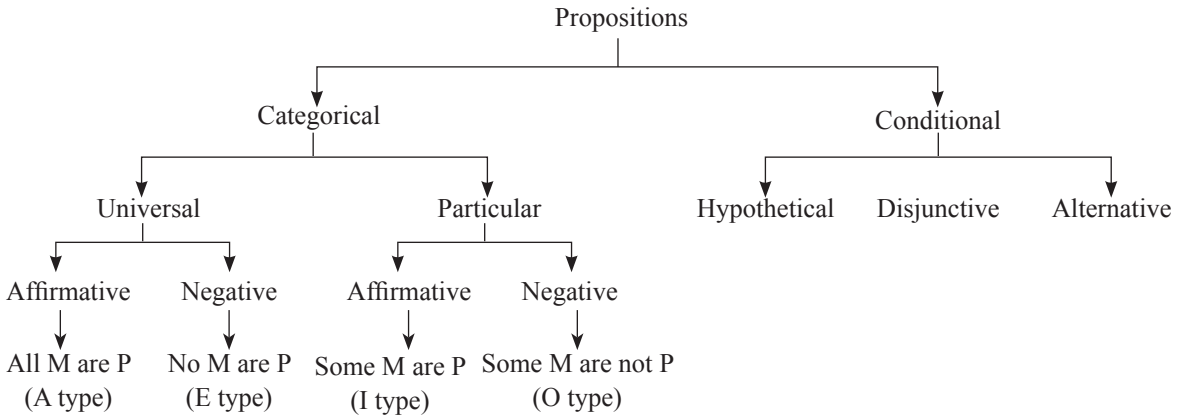
Syllogism is a Greek word that means 'inference' or 'deduction'. The problems of syllogism are based on two parts :

1. Proposition(s) Major Premise, Minor Premise
2. Conclusion(s) drawn from given proposition(s)

A **proposition** is a statement giving a relation between two terms. It has three parts :

(a) the subject
(b) the predicate
(c) the copula [is/ are (not)]

Types of Proposition



CATEGORICAL PROPOSITION

Parts	Example
Major premise	All humans are mortal
Minor premise	All Indians are humans
Conclusion	All Indians are mortal

1. *Major premise:* Predicate of the conclusion is called as the major term. The premise containing major term is called major premise. In the example, **mortal** is the major term.
2. *Minor premise:* Subject of the conclusion is called minor term. The premise containing minor term is called minor premise. In the example, **Indians** is the minor term.
3. *Middle term:* One term common in both the premises is called middle term . It is not a part of conclusion. In the example, **humans** is the middle term.

Constituents of Categorical Proposition

Besides these, the categorical propositions in the traditional classification of propositions have two important elements also, quantity and quality.

Quantity

Quantity refers to the number of members in the class represented by the subject term **universal** of a proposition. It may refer to all the members of a class or to some of the members of a class particular.

Quality

Quality of a proposition indicates whether a proposition is **affirmative or negative**.

Types of Categorical Proposition

Quantity and Quality together give four types of categorical proposition:

1. Universal affirmative------- A
2. Universal negative--------- E
3. Particular affirmative------- I
4. Particular negative---------- O

CONDITIONAL PROPOSITIONS

A conditional proposition is that in which a predicate is assigned or denied to the subject on certain conditions. For instance, "If it rains in time, then crops will be good", "Sita will not go unless she is invited", "Either I will go to watch the movie or sit in the coffee house", "If Mohan is graduate, then he is eligible for this post." etc.

MOOD AND FIGURES

Mood of Syllogism

The mood of a syllogism is determined by the quantity and the quality of its constituent propositions or by the types of (A, E, I, O) standard form categorical propositions it contains. The mood of the syllogism is represented by three letters given in standard form order. The first letter represents the type of major premise,

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the second letter is for the minor premise and the last letter is for the conclusion.

Some Common moods are AAA, IAI, AEE, IEO etc.

Figure of Syllogism

The figure of a syllogism is determined by the position of the middle term in its premises. The middle term occurs in both the major and the minor premises but the position of the middle term is not the same in all syllogisms. There are four possible arrangements of the middle term in the two premises and, thus, there are four figures of a syllogism:-

First Figure

In the first figure, the middle term is the subject of the major premise and predicate of the minor premise. Thus,

M P
S M
So, S is P

Second Figure

In the second Figure, the middle term is the predicate in both the premises. Thus,

P M
S M
So, S is P

Third Figure

In the third figure, the middle term is the subject in both the premises. Thus,

M P
M S
So, S is P

Fourth Figure

In the fourth figure, the middle term is the predicate in the major premise and subject in the minor premise. It is exactly the opposite of the first figure. Thus,

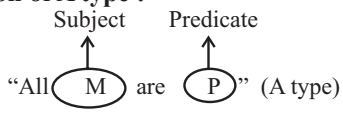
P M
M S
So, S is P

SOLVING PROBLEMS

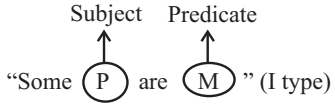
CONVERSION OF PROPOSITIONS

Before solving the problems of syllogism it is a must to know the conversion rules of all A, E, O, and I types of propositions :

Conversion of A type :

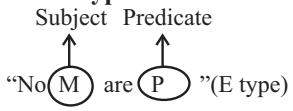


After conversion it becomes.

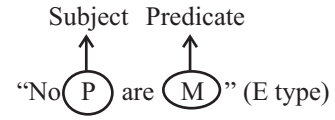


Therefore, it is clear that A type of propositions get converted into I type.

Conversion of E type :

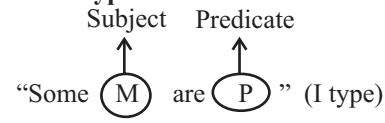


After conversion it becomes

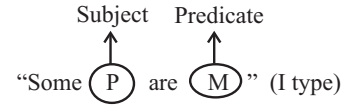


Therefore, E gets converted into E. "sss"

Conversion of I type :



After conversion it becomes



Therefore, I gets converted into I.

Conversion of O type :

O type of proposition can't be converted.

Conclusion Table

I Proposition	II Proposition	Conclusion
A	A	A
A	E	E
E	A	$(O)^R$
E	I	$(O)^R$
I	A	I
I	E	O

A. ANALYTICAL/ ALIGNING METHOD OF SOLVING PROBLEMS

This method has two main steps :

(a) Aligning the pair of sentences.

(b) Using conclusion table to draw conclusion.

What is Aligning ?

Aligning of two statements (propositions) means that the pair of statements must be written in such a way that the common term is the predicate of the 1st sentence and the subject of the 2nd., e.g.,

Statements :

I. Some girls are (cute).

II. All (cute) are tall.

Here, the common term cute is the predicate of the I statement and subject of the 2nd statement. Therefore, the two statements (I & II) are properly aligned.

How to solve?

Illustration

Statements :

I. All rats are cats.

II. All rats are men.

When aligned it takes the form as

I. Some cats are (rats) [I type]

II. All (rats) are men [A type]

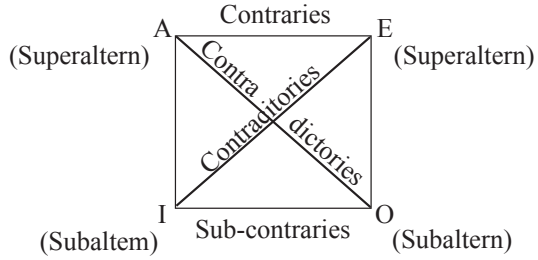
Since, I + A = I type of conclusion.

Therefore, the drawn conclusion must be

"Some cats are men"

SQUARE OF OPPOSITION

Four categorical propositions A, E, I and O are related and at the same time different from each other. The relation among them is explained by the following diagram called the "Square of Opposition".



Two categorical propositions are said to be opposite if they differ in:

1. Quantity
2. Quality
3. Both Quantity and Quality

The pair of AI and EO differs in quantity but not in quality. AI has same quality; both are affirmative but A is universal and I is particular. Similarly EO have same quality; both are negative but E is universal and O is particular. AE and IO differ in quality. Both AE are universal in quantity but A is affirmative and E is negative. Similarly both IO are particular; they have same quantity but I is affirmative and O is negative. The pairs AO and EI, however, differ both in quality and quantity.

Contrary Propositions

Universal affirmative A proposition, "All S is P" and universal negative E proposition, "No S is P" are related to each other by the contrary relation. The proposition "All basket ball players are tall" is contrary to "No basket ball players are tall". Similarly, "No lion is black" is contrary to "All lions are black".

Sub-Contrary Propositions

Particular affirmative I proposition, "Some politicians are well read scholars" is related to O proposition, "Some politicians are not well read scholars" by sub-contrary relation. Similarly O proposition, "Some animals are not carnivorous" is related to I proposition, "Some animals are carnivorous" by sub-contrary relation.

Subaltern and Superaltern Propositions

Universal affirmative A proposition, "All army generals are soldiers" is superaltern to I proposition, "Some army generals are soldiers". Similarly, E proposition, "No fish is mammal" is superaltern to O proposition, "Some fish are not mammals". But I is related to A by subaltern and similarly O is related to E by subaltern. "Some cats are mammals" is subaltern to "All cats are mammals." Similarly, "Some roses are not red things." is subaltern to "No roses are red things."

Contradictory Propositions

The universal affirmative A proposition, "All S is P" is related to particular negative O proposition, "Some S is not P" by contradictory relation. The contradictory of "All men are mortal" is "Some men are not mortal" and vice versa. The contradictory of E proposition, "No egg is red" is I proposition, "Some eggs are red".

1. "All S is P" is contrary to "No S is P" and vice versa.
2. "Some S is P" is sub-contrary to "Some S is not P" and vice versa.
3. (i) "All S is P" is contradictory to "Some S is not P" and vice versa.
   (ii) "No S is P" is contradictory to "Some S is P" and vice versa.
4. (i) "Some S is P" is subaltern to "All S is P".
   (ii) "Some S is not P" is subaltern to "No S is P".
5. (i) "All S is P" is superaltern to "Some S is P".
   (ii) "No S is P" is superaltern to "Some S is not P".

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EXERCISE

1. Which of the following statements say the same thing? **[December-2004]**

(A) "I am clever" (said by Rama)
(B) "I am clever" (said by Raju)
(C) "My son is clever" (said by Rama's father)
(D) "My brother is clever" (said by Rama's sister)
(E) "My brother is clever" (said by Rama's only sister)
(F) "My sole enemy is clever" (said by Rama's only enemy)

Choose the correct answer from the code given below :

Codes :

(a) (A), (C), (D), (E) and (F) (b) (A) and (B)
(c) (D) and (E) (d) (A) and (F)

2. Which of the following statements are mutually inconsistent? **[December-2004]**

(A) Mostly poets are not egoistic
(B) Mostly poets are humble
(C) Some poets are egoistic
(D) Some poets are not non - egoistic

Choose the correct answer from the code given below :

Codes :

(a) (A) and (D) (b) (B) and (C)
(c) (A) and (C) (d) (C) and (D)

3. Which of the following statements are always true ? **[December-2004]**

(A) A wooden table is a table
(B) Now, it is raining or not raining
(C) The sun rises in the East every day
(D) A chicken comes out of a hen's egg

Choose the correct answer from the code given below :

Codes :

(a) (A) and (C) (b) (A), (C) and (D)
(c) (A) and (B) (d) (B) and (C)

4. Which of the following attributes is not required for a proposition to be true? **[June-2005]**

(a) This should be a true statement
(b) This should act at variance with commonly known facts
(c) This should be very appropriate
(d) This should be worth being examined

5. Whole class absents during your coaching period then what will be the most suitable solution of this situation? **[June-2005]**

(a) Inflicting punishment on some pistons students
(b) Inflicting punishment on which class
(c) Giving a warning to the student leaders
(d) Finding out the reason behind the act of student

6. In the following context, which of the following principle is not different from belief? **[June-2005]**

(a) Preceding-Succeeding relation
(b) Acceptability
(c) Authenticity
(d) Orientation

7. **Directions:** There are two statements followed by two conclusions marked I and II. These conclusions are taken to be drawn on the basis of the given statements. Study the given statements and the conclusions drawn carefully and decide your answer. **[June-2005]**

Statement:

All apples are bananas
All bananas are sweets

Conclusion: I some apples are sweets
Conclusion: II some bananas are apples

(a) Only conclusion I follows
(b) Only conclusion II follows
(c) Both conclusions I and II follow
(d) neither conclusions I conclusion II follows

8. **Directions:** There are two statements followed by two conclusions marked I and II. These conclusions are taken to be drawn on the basis of the given statements. Study the given statements and the conclusions drawn carefully and decide your answer. **[June-2005]**

Statements:

All carts are guns
All guns are beds

Conclusions:

I All carts are beds
II All beds are carts

(a) Only conclusion I follows
(b) Only conclusion II follows
(c) Both conclusions I & II follow
(d) Neither conclusion I nor conclusion II

9. Which of the following statements are mutually contradictory? **[December-2006]**

(i) All flowers are not fragrant.
(ii) Most flowers are not fragrant.
(iii) None of the flowers is fragrant.
(iv) Most flowers are fragrant.

Choose the correct answer from the code given below:

Code:

(a) (i) and (ii) (b) (i) and (iii)
(c) (ii) and (iii) (d) (iii) and (iv)

10. Which of the following are correct ways of arguing? **[December-2006]**

(i) There can be no second husband without a second wife.
(ii) Anil is a friend of Bob, Bob is a friend of Raj, hence Anil is a friend of Raj.
(iii) A is equal to B, B is equal to C, hence A is equal to C.
(iv) If everyone is a liar, then we cannot prove it.

Choose the correct answer from the code given below:
Code:
(a) (iii) and (iv) (b) (i), (iii) and (iv)
(c) (ii), (iii) and (iv) (d) (i), (ii), (iii) and (iv)

11. Which one of the following statements is completely non-sensical? **[December-2006]**
(a) He was a bachelor, but he married recently.
(b) He is a bachelor, but he married recently.
(c) When he married, he was not a bachelor.
(d) When he was a bachelor, he was not married.

12. A Syllogism must have: **[June-2007]**
(a) Three terms (b) Four terms
(c) Six terms (d) Five terms

13. "E" denotes: **[June-2007]**
(a) Universal Negative Proposition
(b) Particular Affirmative Proposition
(c) Universal Affirmative Proposition
(d) Particular Negative Proposition

14. Copula is that part of proposition which denotes the relationship between: **[June-2007]**
(a) Subject and predicate
(b) Known and unknown
(c) Major premise and minor premise
(d) Subject and object

15. Syllogistic reasoning is: **[December-2008]**
(a) Deductive (b) Inductive
(c) Experimental (d) Hypothetical

16. Value Judgements are: **[June-2008]**
(a) Factual Judgements
(b) Ordinary Judgements
(c) Normative Judgements
(d) Expression of public opinion

17. The statement, 'To be non-violent is good' is a: **[June-2008]**
(a) Moral judgement (b) Factual judgement
(c) Religious judgement (d) Value judgement

18. The premises of a valid deductive argument: **[December-2008]**
(a) Provide some evidence for its conclusion
(b) Provide no evidence for its conclusion
(c) Are irrelevant for its conclusion
(d) Provide conclusive evidence for its conclusion

19. Two propositions with the same subject and predicate terms but different in quality are: **[December-2008]**
(a) Contradictory (b) Contrary
(c) Subaltern (d) Identical

20. Logical reasoning is based on: **[December-2008]**
(a) Truth of involved propositions
(b) Valid relation among the involved propositions
(c) Employment of symbolic language
(d) Employment of ordinary language

21. Structure of logical argument is based on: **[June-2009]**
(a) Formal validity (b) Material truth
(c) Linguistic expression (d) Aptness of examples

22. To be critical, thinking must be **[December-2009]**
(a) practical (b) socially relevant
(c) individually satisfying (d) analytical

23. A deductive argument is valid if: **[June-2009]**
(a) premises are false and conclusion true
(b) premises are false and conclusion is also false
(c) premises are true and conclusion is false
(d) premises are true and conclusion is true

24. 'No man are mortal' is contradictory of: **[June-2009]**
(a) Some man are mortal (b) Some man are not mortal
(c) All men are mortal (d) No mortal is man

25. In a deductive argument conclusion is : **[June-2009]**
(a) Summing up of the premises
(b) Not necessarily based on premises
(c) Entailed by the premises
(d) Additional to the premises

26. Deductive argument involves **[December-2009]**
(a) sufficient evidence (b) repeated observation
(c) seeing logical relations (d) critical thinking

27. Two statements I and II given below are followed by two conclusions (A) and (B). Supposing the statements are true, which of the following conclusions can logically follow? **[December-2010]**

Statements :
I. Some flowers are red.
II. Some flowers are blue.

Conclusions :
A. Some flowers are neither red nor blue.
B. Some flowers are both red and blue.
(a) Only (A) follows.
(b) Only (B) follows.
(c) Both (A) and (B) follow.
(d) Neither (A) nor (B) follows.

28. Which of the following statements are true? Choose from the codes given below. **[December-2011]**
1. Some arguments, while not completely valid, are almost valid.
2. A sound argument may be invalid.
3. A cogent argument may have a probably false conclusion.
4. A statement may be true or false.

Codes :
(a) 1 and 2 (b) 1, 3 and 4
(c) 4 alone (d) 3 and 4

29. Determine the nature of the following definition :
'Poor' means having an annual income of ₹ 10,000. **[December-2011]**
(a) persuasive (b) precising
(c) lexical (d) stipulative

30. The relation 'is a sister of ' is **[December-2011]**
(a) non-symmetrical (b) symmetrical
(c) asymmetrical (d) transitive

31. The basis of the following classification is 'animal', 'man', 'house', 'book', and 'student' : **[December-2011]**
(a) Definite descriptions (b) Proper names
(c) Descriptive phrases (d) Common names

32. Which one of the following is not an argument? **[December-2011]**
(a) If today is Tuesday, tomorrow will be Wednesday.
(b) Since today is Tuesday, tomorrow will be Wednesday.
(c) Ram insulted me so I punched him in the nose.
(d) Ram is not at home, so he must have gone to town.

33. Determine the nature of the following definition :
"Abortion" means the ruthless murdering of innocent beings. **[June-2012]**
(a) Lexical (b) Persuasive
(c) Stipulative (d) Theoretical

34. Which of the following statements are false ? Choose from the code given below : **[June-2012]**
1. Inductive arguments always proceed from the particular to the general.
2. A cogent argument must be inductively strong.
3. A valid argument may have a false premise and a false conclusion.
4. An argument may legitimately be spoken of as 'true' or 'false'.

Codes :
(a) 2, 3 and 4 (b) 1 and 3
(c) 2 and 4 (d) 1 and 2

35. Which one of the following is not an argument? **[June-2012]**
(a) Devadutt does not eat in the day so he must be eating at night.
(b) If Devadutt is growing fat and if he does not eat during the day, he will be eating at night.
(c) Devadutt eats in the night so he does not eat during the day.
(d) Since Devadutt does not eat in the day, he must be eating in the night.

36. If the proposition "All men are not mortal" is true then which of the following inferences is correct ? Choose from the code given below : **[June-2012]**
1. "All men are mortal" is true.
2. "Some men are mortal" is false.
3. "No men are mortal" is doubtful.
4. "All men are mortal" is false.

Codes :
(a) 1, 2 and 3 (b) 2, 3 and 4
(c) 1, 3 and 4 (d) 1 and 3

37. In the expression 'Nothing is larger than itself' the relation 'is larger than' is **[June-2012]**
(a) antisymmetric (b) asymmetrical
(c) intransitive (d) irreflexive

38. The basis of the following classification is : **[June-2012]**
'first President of India' 'author of Godan' 'books in my library', 'blue things' and 'students who work hard'
(a) Common names (b) Proper names
(c) Descriptive phrases (d) Indefinite description

39. Choose the right code : **[December-2012]**
A deductive argument claims that :
I. The conclusion does not claim something more than that which is contained in the premises.
II. The conclusion is supported by the premise/premises conclusively.
III. If the conclusion is false, then premise/premises may be either true or false.
IV. If premise/combination of premises is true, then conclusion must be true.

Codes:
(a) I and II (b) I and III
(c) II and III (d) All the above

40. By which of the following proposition, the proposition 'some men are not honest' is contradicted ? **[December-2012]**
(a) All men are honest. (b) Some men are honest.
(c) No men are honest. (d) All of the above.

41. A stipulative definition is **[December-2012]**
(a) always true
(b) always false
(c) sometimes true sometimes false
(d) neither true nor false

42. A deductive argument can not be valid : **[September-2013]**
(a) If its premise / premises is/are true and its conclusion is true.
(b) If its premise / premises is /are true and its conclusion is false.
(c) If its premise / premises is/are false and its conclusion is false.
(d) If its premise / premises is / are false and its conclusion is true.

43. "Women are closer to nature than men." What kind of perspective is this ? **[December-2013]**
(a) Realist (b) Essentialist
(c) Feminist (d) Deep ecology

44. Given below are two premises. Four conclusions are drawn from those two premises in four codes. Select the code that states the conclusion validly drawn. **[December-2013]**
Premises :
(i) All saints are religious. (major)
(ii) Some honest persons are saints. (minor)
Codes :
(a) All saints are honest.
(b) Some saints are honest.
(c) Some honest persons are religious.
(d) All religious persons are honest.

45. Given below are some codes of arrangements of three items in order of wider scope. Select the correct code. **[September-2013]**
(a) Garments, cloth and shirts
(b) Cloth, garments and shirts
(c) Shirts, garments and cloth
(d) Garments, shirts and cloth

46. If two propositions cannot both be false but may both be true, what is the relation between the two propositions ? **[September-2013]**
(a) Contrary (b) Sub-contrary
(c) Sub-alternation (d) Contradictory

47. An analogical argument is strengthened by **[September-2013]**
(a) making the claim bolder while its premises remain unchanged.
(b) reducing the claim made on the basis of the premises affirmed.
(c) remaining the claim unchanged while the evidence in its support is found to exhibit greater frailty.
(d) None of the above.

48. Saturn and Mars are planets like the earth. They borrow light from the Sun and moves around the Sun as the Earth does. So those planets are inhabited by various orders of creatures as the earth is. **[December-2013]**
What type of argument is contained in the above passage ?
(a) Deductive (b) Astrological
(c) Analogical (d) Mathematical

49. When the conclusion of an argument follows from its premise/premises conclusively, the argument is called **[December-2013]**
(a) Circular argument (b) Inductive argument
(c) Deductive argument (d) Analogical argument

50. A stipulative definition may be said to be **[December-2013]**
(a) Always true
(b) Always false
(c) Sometimes true, sometimes false
(d) Neither true nor false

51. If two propositions having the same subject and predicate terms are such that one is the denial of the other, the relationship between them is called **[December-2013]**
(a) Contradictory (b) Contrary
(c) Sub-contrary (d) Sub-alternation

52. If two propositions having the same subject and predicate terms can both be true but can not both be false, the relation between those two propositions is called **[June-2014]**
(a) contradictory (b) contrary
(c) subcontrary (d) subaltern

53. Given below are some characteristics of logical argument. Select the code which expresses a characteristic which is not of inductive in character. **[June-2014]**
(a) The conclusion is claimed to follow from its premises.
(b) The conclusion is based on causal relation.
(c) The conclusion conclusively follows from its premises.
(d) The conclusion is based on observation and experiment.

54. "If a large diamond is cut up into little bits, it will lose its value just as an army is divided up into small units of soldiers, it loses its strength." **[June-2014]**
The argument put above may be called as
(a) Analogical (b) Deductive
(c) Statistical (d) Causal

55. By which of the following proposition, the proposition "wise men are hardly afraid of death" is contradicted? **[December-2014]**
(a) Some wise men are afraid of death.
(b) All wise men are afraid of death.
(c) No wise men is afraid of death.
(d) Some wise men are not afraid of death.

56. "A man ought no more to value himself for being wiser than a woman if he owes his advantage to a better education, than he ought to boast of his courage for beating a man when his hands were tied." The above passage is an instance of **[December-2014]**
(a) Deductive argument (b) Hypothetical argument
(c) Analogical argument (d) Factual argument

57. When in a group of propositions, one proposition is claimed to follow from the others, that group of propositions is called **[December-2014]**
(a) An argument (b) A valid argument
(c) An explanation (d) An invalid argument

58. When the purpose of a definition is to explain the use or to eliminate ambiguity the definition is called : **[June-2015]**
(a) Stipulative (b) Theoretical
(c) Lexical (d) Persuasive

59. A deductive argument is invalid if : **[June-2015]**
(a) Its premises and conclusions are all false
(b) Its premises are true but its conclusion is false
(c) Its premises are false but its conclusion is true
(d) Its premises and conclusions are all true

60. A Cluster of propositions with a structure that exhibits some inference is called : **[December-2015]**
(a) An inference (b) An argument
(c) An explanation (d) A valid argument

61. Consider the argument given below :
'Pre - employment testing of teachers is quite fair because doctors, architects and engineers who are now employed had to face such a testing.' **[December-2015]**
What type of argument it is ?
(a) Deductive (b) Analogical
(c) Psychological (d) Biological

62. Which of the following is an example of circular argument? **[June-2015]**
(a) God created man in his image and man created God in his own image.
(b) God is the source of a scripture and the scripture is the source of our knowledge of God.
(c) Some of the Indians are great because India is great.
(d) Rama is great because he is Rama.

63. Consider the following statement and select the correct code stating the nature of the argument involved in it:
To suppose that the earth is the only populated world in the infinite space is as absurd as to assert that in an entire field of millet only one grain will grow. **[July-2016]**
(a) Astronomical (b) Anthropological
(c) Deductive (d) Analogical

64. If the proposition 'All thieves are poor' is false, which of the following propositions can be claimed certainly to be true? **[July-2016]**
Propositions:
(a) Some thieves are poor. (b) Some thieves are not poor.
(c) No thief is poor. (d) No poor person is a thief.

65. Select the code which is not correct in the context of deductive argument with two premises: **[July-2016]**

(a) An argument with one true premise, one false premise and a false conclusion may be valid.
(b) An argument with two true premises and a false conclusion may be valid.
(c) An argument with one true premise, one false premise and a true conclusion may be valid.
(d) An argument with two false premises and a false conclusion may be valid.

66. Select the code which is not correct: **[August-2016]**
An analogical argument is strengthened by
(a) increasing the number of entities.
(b) increasing the number of similar respects.
(c) reducing the claim made earlier stronger.
(d) making the conclusion stronger when premises remain unchanged.

67. Select the code which states the condition of an invalid deductive argument: **[August-2016]**
(a) All the premises are true but the conclusion is false.
(b) Some of the premises are true but the conclusion is false.
(c) All the premises are false and the conclusion is also false.
(d) All the premises are true and the conclusion is also true.

68. Which one among the following is not a characteristic of a deductive type of argument? **[August-2016]**
(a) The conclusion follows from the premise/premises necessarily.
(b) The argument admits degree of complexity.
(c) The argument provides us knowledge about matters of fact.
(d) The argument must be either valid or invalid.

69. If two propositions are connected in such a way that they cannot both be false although they may both be true, then their relationship is called **[August-2016]**
(a) Contrary (b) Subcontrary
(c) Contradictory (d) Subalternation

70. Among the following propositions two are related in such a way that one is the denial of the other. Which are those propositions ? Select the correct code : **[July-2016]**
Propositions :
(A) All women are equal to men
(B) Some women are equal to men
(C) Some women are not equal to men
(D) No women are equal to men
Codes :
(a) (A) and (B) (b) (A) and (D)
(c) (C) and (D) (d) (A) and (C)

71. Given below are two premises, with four conclusions drawn from them (taking singly or together); which conclusions are validly drawn? **[August-2016]**
Select the correct answer from the codes given below:
Premises :
(i) All bats are mammals.
(ii) Birds are not bats.
Conclusions :
(A) Birds are not mammals.
(B) Bats are not birds.
(C) All mammals are bats.
(D) Some mammals are bats.
Codes:
(a) (A), (B) and (D) (b) (B) and (D)
(c) (A) and (C) (d) (B), (C) and (D)

72. Which of the following set of statements represents acceptable propositions in respect of teaching-learning relationships ? Choose the correct code to indicate your answer. **[January-2017]**
(i) When students fail in a test, it is the teacher who fails.
(ii) Every teaching must aim at ensuring learning.
(iii) There can be teaching without learning taking place.
(iv) There can be no learning without teaching.
(v) A teacher teaches but learns also.
(vi) Real learning implies rote learning.
Codes :
(a) (ii), (iii), (iv) and (v) (b) (i), (ii), (iii) and (v)
(c) (iii), (iv), (v) and (vi) (d) (i), (ii), (v) and (vi)

73. Given below are two premises (a) and (b). From those two premises four conclusions (i), (ii), (iii) & (iv) are drawn. Select the code that states the conclusions validly drawn from the premises (taking singly or jointly.)
Premises : **[January-2017]**
(A) Untouchability is a curse.
(B) All hot pans are untouchable.
Conclusions :
(i) All hot pans are curse.
(ii) Some untouchable things are hot pans.
(iii) All curses are untouchability.
(iv) Some curses are untouchability.
Codes :
(a) (i) and (ii) (b) (ii) and (iii)
(c) (iii) and (iv) (d) (ii) and (iv)

74. Among the following propositions two are related in such a way that they cannot both be true but can both be false. Select the code that states those two propositions. **[January-2017]**
Propositions:
(A) Every student is attentive.
(B) Some students are attentive.
(C) Students are never attentive.
(D) Some students are not attentive.
Codes :
(a) (A) and (B) (b) (A) and (C)
(c) (C) and (C) (d) (C) and (D)

75. Men and woman may have different reproductive strategies but neither can be considered inferior or superior to the other, any more than a bird's wings can be considered superior or inferior to a fish's fins. What type of argument it is? **[January-2017]**
(a) Biological (b) Physiological
(c) Analogical (d) Hypothetical

76. If two standard form categorical propositions with the same subject and predicate are related in such a manner that if one is undetermined the other must be undetermined, what is their relation? **[January-2017]**
(a) Contrary (b) Subcontrary
(c) Contradictory (d) Sub-altern

77. A deductive argument is invalid if : **[November-2017]**
(a) Its premises and conclusion are all true.
(b) Its premises and conclusion are all false.
(c) Its premises are all false but its conclusion is true.
(d) Its premises are all true but its conclusion is false.

78. It is Truism to say that no one was there when life first appeared on earth. Any assertion about life's origin, thus, should be treated as a theory.
The above two statements constitute : **[November-2017]**
(a) A historical explanation (b) A narrative
(c) An argument (d) A conjecture

79. Given below are two premises (a and b). From those two premises four conclusions (i), (ii), (iii) and (iv) are drawn. Select the code that states the conclusion/conclusions drawn validly (taking the premises singularly or jointly).
Premises :
(A) All bats are mammals.
(B) No birds are bats. **[November-2017]**
Conclusions :
(i) No birds are mammals.
(ii) Some birds are not mammals.
(iii) No bats are birds.
(iv) All mammals are bats.
Codes :
(a) (i) only (b) (i) and (ii) only
(c) (iii) only (d) (iii) and (iv) only

80. Just as melting ice - cubes do not cause a glass of water to overflow, melting sea - ice does not increase oceanic volume.
What type of argument is it ? **[November-2017]**
(a) Analogical (b) Hypothetical
(c) Psychological (d) Statistical

81. If the proposition 'domestic animals are hardly ferocious' is taken to be false, which of the following proposition/ propositions can be claimed to be certainly true ? Select the correct code : **[July-2018]**
Propositions :
(A) All domestic animals are ferocious.
(B) Most of the domestic animals are ferocious.
(C) No domestic animal is ferocious.
(D) Some domestic animals are non-ferocious.
Codes :
(a) (A) and (B) (b) (A) only
(c) (C) and (D) (d) (B) only

82. Among the following which one of the arguments is rooted in empirical investigation? **[December-2018]**
(a) Inductive (b) Deductive
(c) Hypothetical (d) Implicative

83. Which of the following statements are **correct** with regard to the 'truth and validity' in logical reasoning. Select the correct code from the below: **[December-2018]**
(A) Truth and falsity are attributes of individual propositions
(B) Validity and invalidity are attributes of individual propositions
(C) Truth and falsity are attributes of arguments
(D) Validity and invalidity are attributes of arguments
(a) (A) and (C) (b) (A) and (D)
(c) (B) and (D) (d) (A) and (B)

84. Given below are two premises (1 and 2). Four conclusions are drawn from them. Select the code that states validly drawn conclusion(s) (taking the premises individually or jointly). Premises : **[July-2018]**
(1) Most of the dancers are physically fit.
(2) Most of the singers are dancers.
Conclusions :
(A) Most of the singers are physically fit.
(B) Most of the dancers are singers.
(C) Most of the physically fit persons are dancers.
(D) Most of the physically fit persons are singers.
Code :
(a) (A) and (B) (b) (B) and (C)
(c) (C) and (D) (d) (D) and (A)

85. Identify the correct reasoning in the following argument:
"An English woman lecturing Americans on semicolons is a little like an American lecturing the French on sauces."
[December-2018]
(a) Deductive (b) Analogical
(c) Inductive (d) Hypothetical

86. Among the following, there are two statements which can't be true together, but can be false together. Select the code that represents them : **[December-2018]**
Statements:
(A) All bats are mammals
(B) Some bats are mammals
(C) Some bats are not mammals
(D) No bats are mammals
Code:
(a) (A) and (D) (b) (A) and (C)
(c) (A) an (B) (d) (B) and (C)

87. Given below are two premises (a and b). Four conclusions are drawn from them. Select the code that states validly drawn conclusion (s). [Taking Premises individually or jointly]. **[December-2018]**
Premises: (a) All mammals are warm-blooded animals.
(b) No lizards are warm-blooded animals.
Conclusions: (i) No lizards are mammals.
(ii) Some lizards are not mammals.
(iii) No warm-blooded animals are lizards.
(iv) All warm-blooded animals are mammals.
(a) (iii) and (iv)
(b) (ii) and (iii)
(c) (i) and (iii)
(d) (i) and (ii)

88. In which of the following arguments **'the relation that exists between premises and conclusion is that of logical necessity'**?
[20th June 2019-Ist Shift]
(a) Inductive (b) Deductive
(c) Demonstrative (d) Analogical

89. 'All Judges are fairminded' is an example of _____ proposition. **[20th June 2019-Ist Shift]**
(a) Universal affirmative (b) Universal negative
(c) Particular affirmative (d) Particular negative

90. If proposition 'some milk is curd' is taken to be true, then which of the following propositions can be false?
[20th June 2019-IInd Shift]
(a) No milk is curd (b) All milk is curd
(c) Some curd is milk. (d) Some milk is not curd

91. Identify the reasoning in the following arguments: 'A pilot without flight plans is like an artist without paints.
[20th June 2019-IInd Shift]
(a) Analogical (b) Deductive
(c) Inductive (d) Hypothetical

92. When subject and predicate of both the premises is same but they differ only in quantity, it is known as:
[21st June 2019-Ist Shift]
(a) Subaltern (b) Contraries
(c) Sub contraries (d) Contradictories

93. 'All children are not greedy' is an example of which proposition? **[21st June 2019-IInd Shift]**
(a) Universal Affirmative (b) Universal Negative
(c) Particular Affirmative (d) Particular Negative

94. The argument which claims that its conclusion is conclusively supported by its premises is called
[21st June 2019-IInd Shift]
(a) Analogical Argument (b) Inductive Argument
(c) Demonstrative Argument (d) Deductive Argument

95. The proposition 'Some trees are green' is equivalent to which of the following propositions? **[20th June 2019-IInd Shift]**
(1) Many trees are green.
(2) Some green things are trees.
(3) Some green things are not non-trees.
(4) Trees are usually green.
Select the correct answer from the options given below:
(a) (1), (2), (3) and (4) (b) (2) and (4)
(c) (1) only (d) (3) and (4)

96. If proposition 'All pens are not pencils' is taken to be true, then which of the following propositions can be false?
[21st June 2019-Ist Shift]
(a) All pens are pencils (b) Some pencils are pens
(c) No pen is pencil (d) Some pens are pencils

97. The proposition 'All leaves are green' is equivalent to which of the following propositions?
[21st June 2019-Ist Shift]
(1) No leaves are green
(2) No leaves are non-green
(3) No leaves are in other colour than green
(4) No green is leaf
Select the correct answer from the options given below:
(a) (2), (3) and (4) (b) (1) and (2)
(c) (2) only (d) (2) and (3)

98. Given below are two premises with four conclusions drawn from them. Which of the following conclusions could be validity drawn from the premises?
[21st June 2019-Ist Shift]
Premises:
(i) All fans are tubes
(ii) Bulbs are not tubes
Conclusions:
(A) Fans are not bulbs
(B) All tubes are fans
(C) Fans are bulbs
(D) No tube is bulb
Select the correct answer from the options given below:
(a) (A), (B), (C) (b) (A) and (D)
(c) (A) only (d) (B), (C) and (D)

99. If the proposition 'House are not bricks' is taken to be false, then which of the following propositions can be true?
[24th June 2019-Ist Shift]
(1) All house are bricks.
(2) No house is brick.
(3) Some houses are bricks.
(4) Some houses are not bricks.
Select the correct answer from the options given below:
(a) (2) and (3) (b) (1) and (4)
(c) (2) only (d) (3) only

100. Given below are two premises with four conclusions drawn from them. Which of the following conclusions could be validly drawn from the premises?
[24th June 2019-Ist Shift]
Premises:
(i) No paper is pen
(ii) Some paper is handmade
Conclusions:
(a) All paper is handmade
(b) Some handmade are pen
(c) Some handmade are not pen
(d) All handmade are paper

101. 'All republics are grateful' and 'Some republics are not grateful' cannot both be true, and they cannot both be false. This is called as: **[24th June 2019-Ist Shift]**
(a) contraries (b) contradictories
(c) subaltern (d) super altern

102. The proposition 'No historians are non– mathematician' is equivalent to which of the following proposition?
[24th June 2019-Ist Shift]
(a) All historians are mathematicians
(b) No historians are mathematicians
(c) Some historians are mathematicians
(d) Some historians are not mathematicians

103. Consider the argument provided below: "Sound is permanent because it is a product like the jar". Identify the fallacy involved in the above argument on the basis of Indian logic from the options given below:
[24th June 2019-IInd Shift]
(a) Fallacy of contradictory reason
(b) Fallacy of wrong assertion
(c) Fallacy of irrelevant reason
(d) Fallacy of trivial reason

104. Inductive argument proceeds from:
[24th June 2019-IInd Shift]
(a) Universal to Particular (b) Particular to Universal
(c) Universal to Universal (d) Particular to Particular

105. Statements:
No Musicians are Japanese.
All Barbers are Musicians.
No Barbers are Japanese.
Identify the Middle Term in the above syllogism.
[24th June 2019-IInd Shift]
(a) Subject in the first premise and predicate in the second premise.
(b) Predicate in the first premise and subject in the second premise.
(c) Predicate in the both premises.
(d) Subject in both the premises.

106. Identify the argument under which instantial propositions are inferable from Universal Proposition.
[25th June 2019-Ist Shift]
(a) Deductive argument (b) Inductive argument
(c) Reductive argument (d) Analogical argument

107. When subject and predicate of both the premises is same but they differ in quality as well as quantity, it is known as
[25th June 2019-IInd Shift]
(a) Superaltern (b) Contraries
(c) Contradictories (d) Subaltern

108. Identify the reasoning in the following argument:
'Method of teaching in the classroom can be compared to architectural plan of a building'. **[25th June 2019-IInd Shift]**
(a) Analogical (b) Hypothetical
(c) Inductive (d) Deductive

109. The proposition 'No red is black' is equivalent to which of the following propositions? **[26th June 2019-Ist Shift]**
(i) No black is red (ii) All red are black
(iii) Some red are not black (iv) Red is not black
Select the correct answer from the options given below:
(a) (i), (ii), (iii) and (iv) (b) (iii) only
(c) (i) and (iv) (d) (iv) only

110. If proposition 'Students are serious' is taken to be false then which of the following propositions can be true?
[25th June 2019-IInd Shift]
(a) All students are serious
(b) All students are not serious
(c) Some students are not serious
(d) Some serious ones are not students
Select the correct answer from the options given below:
(a) (a) only (b) (b) and (d)
(c) (d) only (d) (b) and (c)

111. The proposition 'All birds are cows' is equivalent to which of the following propositions? **[25th June 2019-IInd Shift)]**
(1) Some cows are birds
(2) Some cows are not non-birds
(3) Some birds are cows
(4) Many birds are cows
Select the correct answer from the options given below:
(a) (1) only (b) (3) & (4)
(c) (1), (2), (3) & (4) (d) (4) only

112. Given below are two premises with four conclusions drawn from them. Which of the following conclusions could be validly drawn from the premises?
[25th June 2019-IInd Shift]
Premises:
(a) Some rings are bells
(b) No ring is ornament
Conclusions:
(a) All bells are ornaments
(b) Some ornaments are not bells
(c) No ring is bell
(d) All bells are not ornaments

113. Given below are two premises with four conclusions drawn from them. Which of the following conclusions could be validly drawn from the premises?
[26th June 2019-Ist Shift]
Premises:
(i) Some bags are tables
(ii) All bags are chairs.
Conclusions:
(1) Some tables are chairs.
(2) No chair is table.
(3) Some chairs are bags.
(4) Some bags are not tables.
Select the correct answer from the options given below:
(a) (1) and (3)
(b) (2), (3) and (4)
(c) (1) and (4)
(d) (2) only

114. If proposition 'All republics are grateful' is taken to be true, then which of the following propositions can be false?
[26th June 2019-Ist Shift]
(i) Republics are not grateful
(ii) Some republics are not grateful
(iii) No republics are grateful
(iv) Some republics are grateful
Select the correct answer from the options given below
(a) (i) only
(b) (ii) only
(c) (i), (ii) and (iii)
(d) (ii) and (iii)

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115. Identify the minor term in the following syllogism:
[26th June 2019-II Shift]

"Some books are not edifying.
All books are interesting.
Therefore, some interesting things are not edifying"

(a) Subject of the conclusion and predicate of the second premises
(b) Predicate of the conclusion and predicate of the first premises
(c) Subject of the both premises
(d) Predicate of the both premises

116. When subject and predicate of both the premises are the same but they differ in quality only, it is known as:
[26th June 2019-I Shift]

(a) Contradictories (b) Contraries
(c) Subaltern (d) Super altern

117. Which of the following refers to an attribute of every categorical proposition which is determined by whether the proposition affirms or denies class inclusion?
[2nd Dec. 2019-I Shift]

(a) Quality (b) Quantity
(c) Distribution (d) Comparison

118. "All students cleared their examination"and "Few students did not clear their examination". This is an instance of _____.
[2nd Dec. 2019-II Shift]

(a) Contradictories (b) Superaltern
(c) Subaltern (d) Contraries

119. 'Some students are sincere" is an example of which preposition?
[2nd Dec. 2019-II Shift]

(a) Universal Affirmative.
(b) Universal Negative.
(c) Particular Affirmative.
(d) Particular Negative.

120. In which of the following propositions, both can be true simultaneously but cannot be false simultaneously?
[3rd Dec. 2019-I Shift]

(a) Contrary (b) Contradiction
(c) Sub contrary (d) Subaltern

121. The attributes shared by all and only those objects to which a term refers is known as
[3rd Dec. 2019-II Shift]

(A) The intension of a term
(B) Connotation
(C) Denotation
(D) The extension of a term

Choose the correct code from below:

(a) (D) only (b) Both (A) and (B)
(c) Both (C) and (D) (d) (C) only

122. According to traditional square of opposition, if two propositions are so related that they cannot both be false. although they may both be true, They are called:
[3rd Dec. 2019-II Shift]

(a) Sub alterns (b) Sub contraries
(c) Contradictories (d) Contraries

123. An informed fallacy in which the conclusion of an argument is stated or assumed in any one of the premises is known as:
[3rd Dec. 2019-IInd Shift]

(A) Begging the question
(B) Circular argument
(C) Ignoratio elenchi
(D) Petitio principii

Choose the correct option from the following:

(a) (A), (B) and (D) (b) (A) and (C)
(c) (C) only (d) (B), (C) and (D)

124. Consider the following argument: **[4th Dec. 2019-Ist Shift]**
Statements: Some chairs are curtains.
All curtains are bedsheets.
Conclusion: Some chairs are bedsheets.
What is the Mood of the above proposition?

(a) IAI (b) IAA
(c) IIA (d) AII

125. Which of the following is converse of 'Some S is P"?
[4th Dec. 2019-Ist Shift]

(a) Some S is not P (b) Some P is not S
(c) Some P is S (d) No P is S

126. Which of the following modes of communication can be employed in a classroom for effective teaching?
[4th Dec. 2019-Ist Shift]

(A) Top-down (B) Iconic
(C) Associational (D) Dissociational
(E) Symbolic (F) Abstract

Choose the most appropriate option from the following :

(a) (A),(B) and (F) (b) (C),(E)and (F)
(c) (B),(C) and (E) (d) (A), (C) and (D)

127. As per the classical square of opposition, if 'A' proposition is given as true, then which one he following is correct?
[4th Dec. 2019-IInd Shift

(a) "E" proposition is false, "I" proposition is true and "O" proposition is false
(b) "E" proposition is true, "I" proposition is true and "O" proposition is true
(c) "E" proposition is false, "I" proposition is false and "O" proposition is true
(d) "E" proposition is true, "I" proposition is false and "O" proposition is false

128. Consider the following statements with reference to the proposition "Some girls are not students"
[4th Dec. 2019-IInd Shift]

(A) Subject term students is distributed
(B) Predicate term girls is undistributed
(C) Predicate term students is distributed
(D) Subject term girls is undistributed

Choose the correct option from those given below:

(a) Only (A) and (C) are correct
(b) Only (B) and (C) are correct
(c) Only (A) and (D) are correct
(d) Only (C) and (D) are correct

129. Which one of the following is not a part of immediate deductive inference? **[5th Dec. 2019-Ist Shift]**
(a) Conversion (b) Obversion
(c) Syllogism (d) Contraposition

130. Considered the following statements with reference to categorical propositions: **[5th Dec. 2019-Ist Shift]**
(A) "Some birds are mammals" is a particular affirmative proposition and it distributes subject term alone.
(B) "Some birds are mammals" is a particular affirmative proposition and it distributes predicate term alone.
(C) "Some birds are mammals" is a particular affirmative proposition and it distributes both subject and predicate terms.
(D) "Some birds are mammals" is a particular affirmative proposition and it distributes neither subject term nor predicate term.
Choose the correct option from below :
(a) Only (A) and (D) are correct
(b) Only (C) and (D) are correct
(c) Only (B) is correct
(d) Only (D) is correct

131. Which one of the following combination of propositions is considered to be contraries in the classical square of opposition? **[5th Dec. 2019-Ist Shift]**
(a) Universal affirmative and universal negative
(b) Universal affirmative and particular affirmative
(c) Particular affirmative and universal negative
(d) Particular affirmative and particular negative

132. If two propositions are related in such a way that they cannot both be true together, although both may be false together, then such a relation is considered to be **[5th Dec. 2019-IInd Shift]**
(a) Contrary (b) Contradictory
(c) Subaltern (d) Sub-contrary

133. Which one of the following statements is correct with reference to a deductive argument? **[5th Dec. 2019-IInd Shift]**
(a) The relation between premises and conclusion is one of matter of facts
(b) The relation between premises and conclusion is one of logical necessity
(c) The relation between premises and conclusion is that of empirical necessity
(d) The relation between premises and conclusion is a matter of ascertainment of probability

134. Which one of the following is true with respect to the first figure of categorical syllogism? **[5th Dec. 2019-IInd Shift]**
(a) The middle term is the subject of the major premise and the predicate of the minor premise
(b) The middle term is the predicate of the major premise and subject of the minor premise
(c) The middle term is the subject of the major premise and the predicate of the conclusion
(d) The middle term is the subject of the minor premise and the predicate of the conclusion

135. Identify the technical term used to describe body language from the following **[5th Dec. 2019-IInd Shift]**
(a) Proxemics (b) Chronemics
(c) Kinesics (d) Haptics

136. "In this hospital, some nurses don't wear white dress, some doctors have private practice and medicines prescribed are of high cost. Therefore, treatment in this hospital is of poor quality". What fallacy does this argument make? **[6th Dec. 2019-Ist Shift]**
(a) Fallacy of composition (b) Slippery slope
(c) Fallacy of accident (d) Fallacy of division

137. Consider the following statements and choose the right option **[6th Dec. 2019-Ist Shift]**
A. Middle term should be distributed in at least one premise
B. Middle term should be present in the conclusion
C. Both premises can be particular in a valid argument
D. Both premises can be negative in a valid argument
(a) (C) and (D) (b) Only (C)
(c) Only (A) (d) (B) and (C)

138. "If it rains, then the drought will end. The drought has ended. Therefore, it rained". Which kind of fallacy does this commit? **[6th Dec. 2019-Ist Shift]**
(a) Deductive fallacy (b) Inductive fallacy
(c) Abductive fallacy (d) Informal fallacy

139. "Mr X lives in a slum and is unemployed. Therefore, Mr X deserves to be a minister."
Which kind of fallacy is committed in this argument? **[6th Dec. 2019-IInd Shift]**
(a) Fallacy of Composition (b) Ad misericordium
(c) Fallacy of Division (d) Fallacy of Accident

140. Under which of the conditions an argument may be valid ? Select the correct answer from the code given below : **[2nd Dec. 2019-IInd Shift]**
Statements :
(A) When its conclusion and premises are true.
(B) Even when its conclusion and one or more of its premises are false.
(C) Only when its conclusion is true.
Code :
(a) (A) and (B)
(b) (A) alone
(c) (A) and (C)
(d) (C) alone

141. "All tigers are animals." This is an example of which type of proposition? **[3rd Dec. 2019-Ist Shift]**
(a) Particular Negative
(b) Particular Affirmative
(c) Universal Negative
(d) Universal Affirmative

142. Given below are two premises with four conclusions drawn from them. Which of the following is valid conclusion drawn from the premises? **[3rd Dec. 2019-IInd Shift]**
Premises: (i) All diaries are copies
(ii) No copy is book

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Conclusions :

(A) Some diaries are books

(B) Some books are copies

(C) No book is copy

(D) No diary is book

Choose the correct option :

(a) (B) and (B) (b) (C) and (D)

(c) (B) and (C) (d) (A) and (D)

143. Which one of the following propositions is a contrary to "All poets are dreamers"? **[4th Dec. 2019-IInd Shift]**

(a) Some poets are dreamers

(b) Some poets are not dreamers

(c) No poets are dreamers

(d) No dreamers are poets

144. Which one of the following is the characteristic feature of an argument? **[6th Dec. 2019-Ist Shift]**

(a) It is either valid or invalid

(b) It is neither valid nor invalid

(c) It is either true or false

(d) It is neither true nor false

145. In the statement "No dogs are reptiles", which terms are distributed? **[6th Dec. 2019-IInd Shift]**

(a) Only subject term

(b) Only predicate term

(c) Both subject and predicate terms

(d) Neither subject nor predicate term

146. The converse of "All cats are mammals" is **[6th Dec. 2019-IInd Shift]**

(a) Some mammals are not cats

(b) No mammals are cats

(c) Some mammals are cats

(d) All mammals are cats

147. All gentlemen are polite

No criminals are polite

No criminals are gentlemen.

Identify the major term in above syllogism. **[6th Dec. 2019-Ist Shift]**

(a) Predicate in the premises

(b) Subject in the premises

(c) Subject of the first premise and predicate of the conclusion

(d) Subject of the second premise and subject of the conclusion

148. A definition put forward to resolve a dispute by influencing attitudes or stirring emotions is called

(a) Lexical (b) Persuasive

(c) Stipulative (d) Precisions

149. When a definition implies a proposal to use the definiendum to mean what is meant by the definiens it is called **[25th June 2019-Ist Shift]**

(a) Lexical difinition (b) Stipulative definition

(c) Precising definition (d) Persuasive definitioin

HINTS & EXPLANATION

1. (a) Statements (A), (C) (D), (E) and (F) are same.

2. (a) 3. (b)

4. (b) This should act at variance with commonly known facts

A proposition is a declarative sentence that is either true (denoted either T or 1) or false (denoted either F or 0). For a proposition to be true or valid, it should be a very appropriate

and true statement; and should be worth being examined and verified.

5. (d) If the entire class remains absent, it points to some issue between the teacher and the taught. It is the responsibility of the teacher to go to the root of the problem and find the solution. At the same time, punishing a few or holding student leaders responsible would be unfair; while punishing the whole class, meaningless.

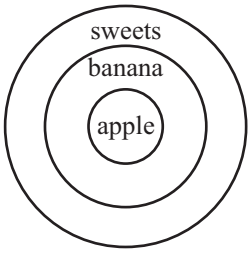
6. (b) Acceptability pertains to the characteristic of being agreed to or approved of by virtue of satisfactorily meeting the norm or expectation. Belief also is an approval of or agreement with something as true even without proof. All of the other three are different from belief.

A preceding-succeeding relation ascribes scheduled time property values to sequence the related activities.

Authenticity pertains to genuineness rather than being a reproduction, copy or masquerade.

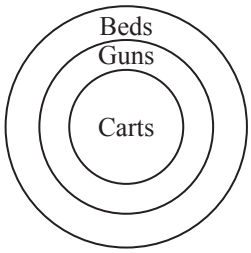
Orientation refers to the system of ideas and assumptions that provide a starting point for a project.

7. (b)



Only II conclusion follows.

8. (a)



9. (d) 10. (a)

11. (b) 'He is Bachelor, but he married recently' is senceless.

12. (a) Syllogism must have three terms,
(i) Subject (ii) Predicate (iii) Copula

13. (a) 'E' denotes Universal Negative proposition

14. (a) Copula is that part of Proposition which denotes the relationship between subject and predicate

As, All	Men	are	Boys
↓	↓	↓	
Subject	Copula	Predicate	

15. (a) A syllogism is a kind of logical argument that applies deductive reasoning to arrive at a conclusion based on two or more propositions that are asserted or assumed to be true.

16. (c) A value judgment (or value judgment) is a judgment of the rightness or wrongness of something or someone, or of the usefulness of something or someone, based on a com-parison or other relativity.

17. (a)

18. (d) A deductive argument is the presentation of statements that are assumed or known to be true as premises for a conclusion that necessarily follows from those statements. The classic deductive argument, for example, goes back to antiquity: All men are mortal, and Socrates is a man; therefore Socrates is mortal.

19. (c) A subaltern proposition; a proposition implied by a universal proposition. For example, some crows are black is a subaltern of all crows are black.

20. (b) Logical reasoning is the process of using a rational, systematic series of steps based on sound mathematical procedures and given statements to arrive at a conclusion.

21. (a) A logical argument (or just argument) is a process of creating a new statement from one or more existing statements. An argument proceeds from a set of premises to a conclusion, by means of logical implication, via a procedure called logical inference. Structure of logical argument is based on formal validity.

22. (d) Analytical thinking is a critical component of visual thinking that gives one the ability to solve problems quickly and effectively. It involves a methodical step-by-step approach to thinking that allows you to break down complex problems into single and manageable components.

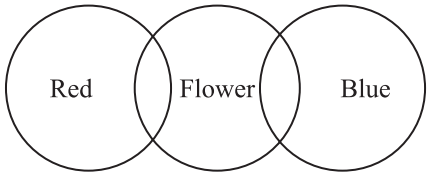
23. (d) A deductive argument is said to be valid if and only if it takes a form that makes it impossible for the premises to be true and the conclusion nevertheless to be false. Otherwise, a deductive argument is said to be invalid.

24. (a)

25. (c) A deductive argument is an argument that is intended by the arguer to be deductively valid, that is, to provide a guarantee of the truth of the conclusion provided that the argument's premises are true

26. (c) A deductive argument is an argument in which it is thought that the premises provide a guarantee of the truth of the conclusion. In an inductive argument, the premises are intended only to be so strong that, if they are true, then it is unlikely that the conclusion is false.

27. (d)



Neither (A) nor (B) follows.

28. (c)

29. (d) A stipulative definition is a type of definition in which a new or currently-existing term is given a new specific meaning for the purposes of argument or discussion in a given context.

30. (b) Exists when both people vie for power and control of decision making. Submissive Symmetrical Relationship. Created when neither partner wants to take control or make decisions. Parallel Relationships. A shifting back and forth of the power between partners, depending on the situation.

31. (d)

32. (d)

33. (b) A persuasive definition is a form of stipulative definition which purports to describe the 'true' or 'commonly accepted' meaning of a term, while in reality stipulating an uncommon or altered use, usually to support an argument for some view, or to create or alter rights, duties or crimes.

34. (c) Following statements are false–

- A cogent argument must be inductively strong.
- An argument may legitimately be spoken of as 'true' or 'false'.

35. (b) Wrong argument is-lf Devadutt is growing fat and if he does not eat during the day, he will be eating at night.

36. (b) Correct codes are–

- "Some men are mortal" is false.
- "No men are mortal" is doubtful.
- "All men are mortal" is false.

37. (d) A binary relation is called irreflexive, or anti-reflexive, if it doesn't relate any element to itself. An example is the "greater than" relation (x > y) on the real numbers.

38. (c) 39. (a)

40. (a) All men are honest.

41. (d) A stipuiative definition is a type of definition in which a new or currently-existing term is given a specific meaning for the purposes of argument or discussion in a given context.

42. (b) A deductive argument is an argument that is intended by the arguer to be deductively valid, that is, to provide a guarantee of the truth of the conclusion provided that the argument's premises are true. One of the most famous examples of deductive reasoning is from Aristotle: All men or mortal. Socrates is a man. Therefore, Socrates is mortal.

43. (b) Essentialism is the view that for any specific entity there is a set of attributes which are necessary to its identity and function.

Feminism observes gender in terms of power, in face-to-face interaction as well as within a social structure.

Realism rejects imaginative idealization and favours the accurate and detailed depiction of nature or of contemporary life without any enrichment.

The deep ecology perspective recognises the inherent value of all living beings and uses this view in shaping environmental policies.

44. (c) Statement :

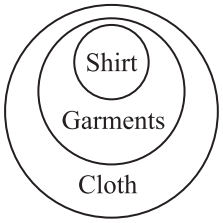
I. All Saints are religious.

II. Some honest persons are Saints.

Some honest persons are religious.

Becauuse 'Saints' is middle term and middle term should not be present in conclusion.

45. (b)



46. (b) Two statements are said to be subcontrary if they can both be true, but they cannot both be false.

47. (b) Argument from analogy is a special type of inductive argument, whereby perceived similarities are used as a basis to infer some further similarity that has yet to be observed. Analogical reasoning is one of the most common methods by which human beings attempt to understand the world and make decisions.

48. (c) Analogical reasoning is any type of thinking that relies upon an analogy. An analogical argument is an explicit rep-resentation of a form of analogical reasoning that cites ac-cepted similarities between two systems to support the con-clusion that some further similarity exists.

49. (c) A deductive argument is an argument that is intended by the arguer to be deductively valid, that is, to provide a guarantee of the truth of the conclusion provided that the argument's premises are true.

50. (d) A stipulative definition may be said to be Neither true nor false.

51. (a) If two propositions having the same subject and predi-cate terms are such that one is the denial of the other, the relationship between them is called contradictory.

52. (c) Contrary is the relationship between two propositions when they cannot both be true (although both may be false). Thus, we can make an immediate inference that if one is true, the other must be false. The law holds for the A and E propositions of the Aristotelian square of opposition.

53. (c) An inductive argument is an argument that is intended by the arguer to be strong enough that, if the premises were to be true, then it would be unlikely that the conclusion is false. So, an inductive argument's success or strength is a matter of degree, unlike with deductive arguments. Inductive reasoning makes broad

generalizations from specific observations. Basically, there is data, then conclusions are drawn from the data. ... Even if all of the premises are true in a statement, inductive reasoning allows for the conclusion to be false. Here's an example: "Harold is a grandfather.

54. (a) Analogy is a comparison between two things. Analogies function to describe or explain one thing by examining its similarities with another thing. The two things may be very dissimilar and the analogy forces the reader or listener to understand the connection between them.

55. (b) 56. (c)

57. (a) An argument is any group of propositions where one proposition is claimed to follow from the others, and where the others are treated as furnishing grounds or support for the truth of the one. An argument is not a mere collection of propositions, but a group with a particular, rather formal, structure.

58. (c) A lexical definition or reportive definition explains how a word is actually used in general contexts. It may be accurate, inaccurate, true, or false.

59. (b) A deductive argument is invalid if. Its premises are true but its conclusion is false.

60. (b) An argument is any group of propositions of which one is claimed to folow from the others, which are regarded as providing support or grounds for the truth of that one.

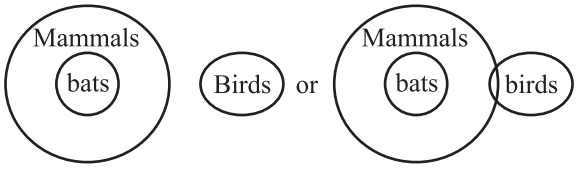
61. (b) Analogical reasoning is simply reasoning from an analogy. In other words, it is making an argument by comparing two cases. When using analogical reasoning, it is important that the cses are comparable. Remember, although two cfases or situations may be very similar, they are never identical. To remedy this situation, once again we suggest using inoculation. You should point out the differences and minimize them.

62. (b) Circular reasoning is a logical fallacy in which the reasoner begins with what they are trying to end with. The components of a circular argument are often logically valid because if the premises are true, the conclusion must be true.

63. (d) 64. (b) 65. (b) 66. (d) 67. (a) 68. (c)

69. (b) 70. (d)

71. (b)



According to diagram
only (B) and (D) logically valid.

72. (b) Statement (iv) is incorrect because self-learning is an effective way of learning. Statement (vi) is incorrect because real learning implies learning with understanding while rote learning is cramming without understanding.

73. (d) The conclusions validly drawn from the premises are–
(ii) Some untouchable things are hot pans, (iv) Some curses are untouchability.

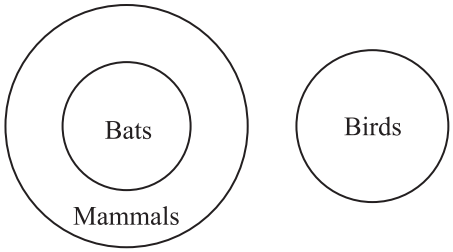
74. (b) Propositions are contrary when they cannot both be true. An A proposition, e.g., "all giraffes have long necks" cannot be true at the same time as the corresponding E proposition: "no giraffes have long necks"

75. (c) Analogical argument is a kind of inductive argument in which, from the fact two entities are alike in some respect, it is concluded that they are also alike in some other respect.

76. (d) This happens in Sub-altern (A + I or E + O) consider the follow:
All Trees are flowers (A)
Some Trees are flowers (I)
'Some Trees are flowers' is true, it is difficult to come up with a single venn diagram (because there is a possibility that some trees are not flowers)
In that situation, the universal positive (A) [All trees are flowers] will be undetermined because we can't draw a single venn diagram.

77. (d) 78. (c)

79. (c)



Only Conclusion (iii) follows

80. (a)

81. (a) 'domestic animals are hardly ferocious' if taken to be false, becomes 'most of the domestic animals are ferocious'. So, the answer is option (A).

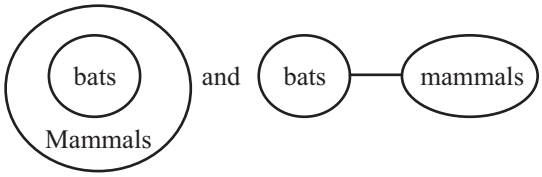
82. (a)

83. (b) Truth and falsity, on the other hand, are attributes of individual prepositions and validity and invalidity are attributes of arguments.

84. (b)

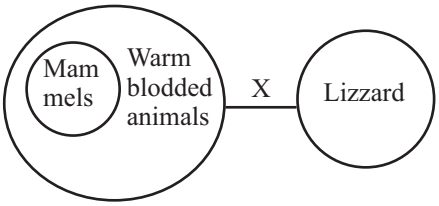
85. (b) These two statements which can not be true together but can be false together.

86. (a)



all boats are mammals
No bats are mammals.

87. (c)



Only (i) and (iii) conclusion follow.

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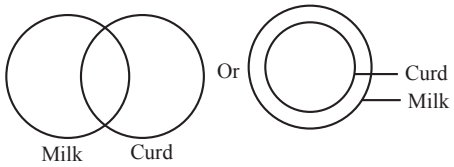
88. (b) In the process of deduction, the premises are assumed to be true to determine/ prove/ conclude what would logically follow or will have to be true if the premises are true. The premises are intended to provide such strong support for the conclusion that, if the premises are true, then it would be impossible for the conclusion to be false. So, the relation between premises and conclusion is that of logical necessity.

89. (a) 'All' suggests the proposition has universal reach; absence of negative word like 'no, not, etc.', indicates it is affirmative.

90. (a)



For proposition "all milk is curd"; "some milk is curd" also is a true proposition.

But 'No milk is curd' is definitely false.

91. (a) Analogical reasoning relies upon analogy, citing accepted similarities between two systems to support the conclusion that some further similarity exists.

92. (a) A proposition is a **subaltern** of another if it must be true in case its superaltern is true, and its superaltern must be false in case the subaltern is false.

Sub-contrary propositions are those two propositions which can both be true but cannot both be false

Two propositions are **contrary**, if they cannot both be true, but they might both be false. They have same subjects and predicates; and, are *different in qualities* but have the same universal quantities.

Two propositions are **contradictory**, if one of them is a denial of another. They cannot both be true, and cannot both be false. They have same subjects and predicates but are different in quantities (all, some, no) as well as qualities.

93. (d) 'All S are not P' is the obverse of 'No S are P' which is a universal negative proposition.

94. (d) In deductive arguments conclusions are certain provided the premises are true.

In inductive arguments, even if all of the given premises are true, there is a possibility for the conclusion to be false.

In analogical arguments, two similar things are compared/associated, such that, what is true of one is also true of the other. So, conclusion may not be conclusively drawn from the premises.

Both demonstrative and non-demonstrative processes use analogy to prove/justify knowledge; and to obtain new knowledge, respectively. So, the conclusion cannot be drawn conclusively from the given premises.

95. (a) 'Some trees are green' is equivalent to 'some green things are trees' or 'some green things are not non-trees'.

'Some trees are green' is also equivalent to 'many trees are green' or 'trees are usually green'.

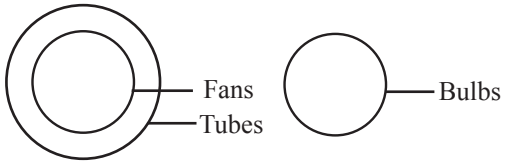
Hence, all the given prepositions are equivalent.

96. (a) The proposition 'all pens are not pencils' is equivalent to 'some pencils are pens' or 'some pens are pencils' or 'no pen is pencil'.

But 'all pens are not pencils' is negative proposition to 'all pens are pencils'. Hence this is false.

97. (d) The proposition, 'All leaves are green' can also be stated as 'No leaves are non-green' (it is the obverse of the given proposition) without any change in meaning. Again, 'non-green' means 'any colour other than green.

98. (b)



Conclusions that follows are:

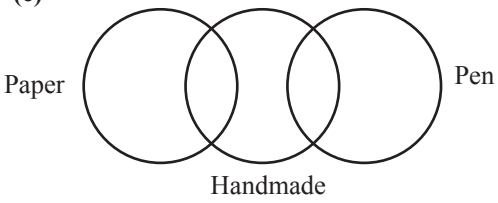
Fans are not bulbs

And no tube is bulb.

99. (d) 'House are not bricks' is false. Then its negative proposition must be true.

'Some houses are bricks' must be true.

100. (c)



As, no paper is Pen, and some paper is handmade.

So, some handmade cannot be pen.

101. (b) Two propositions are **contradictory**, if one of them is a denial of another. They cannot both be true, and cannot both be false. They have same subjects and predicates but are different in quantities (all, some, no) as well as qualities.

Two propositions are **contrary**, if they cannot both be true, but they might both be false. They have same subjects and predicates; and, are different in qualities but have the same universal quantities.

A **superaltern** is a universal proposition that is the basis for the immediate inference of a corresponding particular proposition.

A proposition is a subaltern of another if it must be true in case its superaltern is true, and its superaltern must be false in case the subaltern is false.

102. (a) The proposition 'No historian are non-mathematician' is equivalent to 'All historian are mathematicians'. And its negative proposition is 'No historians are mathematicians'.

103. (a) In the argument, 'Sound is permanent because it is a product like the jar'; the *probandum* (that is to be proved) 'permanent' is absent in the subject and so it involves the fallacy of contradiction (badha) and the *probans* (reason/evidence) is called contradicted *probans* (badhita).

104. (b) Inductive reasoning is "bottom up", the chain of evidence begins with an observation and then combines it with the strength of previous observations in order to arrive at a conclusion.

Deductive reasoning is "top-down" and proceeds from one or more general axioms and comes to a certain, specific conclusion using logic alone. If the premises are true and the logic of the argument is valid, the conclusion is certainly true.

105. (a) A **categorical syllogism** is an argument consisting of three categorical propositions (two premises and a conclusion) in which appear exactly three categorical **terms**, each of which is used exactly twice. The **middle term** is the one that appears in both premises but not in the conclusion.

106. (a) Categorical propositions are deductive arguments of 4 types: A, E, I and O.

Code	Quantifier	Subject	Copula	Predicate	Type	Example
A	All	S	are	P	universal affirmative	All animals are herbivores.
E	No	S	are	P	universal negative	No animals are carnivores
I	Some	S	are	P	particular affirmative	Some animals are birds.
O	Some	S	are not	P	particular negative	Some animals are not humans.

So, instantial proposition i.e., proposition for any instance/occurrence can be inferred from universal proposition in deductive argument.

107.(c) Two propositions are **contradictory**, if one of them is a denial of another. They cannot both be true, and cannot both be false. They have same subjects and predicates but are different in quantities as well as qualities.

Two propositions are **contrary**, if they cannot both be true, but they might both be false. They have same subjects and predicates; and, are different in qualities but have the same universal quantities.

A **superaltern** is a universal proposition that is the basis for the immediate inference of a corresponding particular proposition.

A proposition is a **subaltern** of another if it must be true in case its superaltern is true, and its superaltern must be false in case the subaltern is false.

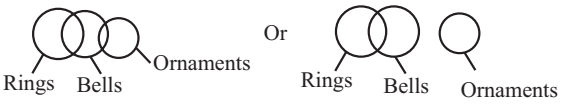
108.(a) In analogical reasoning, accepted similarities between two systems are cited to support the conclusion that some further similarity exists.' In this argument, two systems, namely 'method of teaching in the classroom' and 'architectural plan of a building' are being compared citing the accepted similarities between them.

109.(c) 'No red is black' is equivalent to
'No black is red' and this is equivalent to
'Red is not black'.
'All red are black' is negative proposition.
Hence, only conclusion (i) and (iv) are correct.

110. (d) 'Students are serious' is false statement then its negation 'students are not serious' must be a true statement.
Now, equivalent proposition of 'students are not serious' is 'All students are not serious' and also 'some students are not serious' can be true statements.

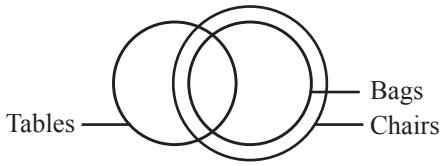
111.(c) 'All birds are cows' is true proposition. Then its equivalent proposition 'Some or many birds are cows' will be also true.
Again, its inverse proposition, 'All or some cows are birds' and its negation 'Some cows are not non-birds' will be also true.

112. (d)



Hence, only conclusions (d) is true. In any cases all bells are not ornaments.

113. (a)



Hence, 'Some tables are chairs'
and 'Some chairs are bags'
are the correct proposition.

114. (c) The given proposition are 'All republics are grateful'
It's negative proposition are 'No republics are grateful' or 'Republics are not grateful'. This is equivalent to 'Some republics are not grateful'.

115. (a) Here subject of the conclusion and predicate of the second premises are 'Interesting'. And in the given syllogism, the word 'interesting' is a minor term**.**

116.(b) Two propositions are **contrary**, if they cannot both be true, but they might both be false. They have same subjects and predicates; and, are *different in qualities* but have the same universal quantities.

Two propositions are **contradictory**, if one of them is a denial of another. They cannot both be true, and cannot both be false. They have same subjects and predicates but are different in quantities (all, some, no) as well as qualities.

A **superaltern** is a universal proposition that is the basis for the immediate inference of a corresponding particular proposition.

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A proposition is a **subaltern** of another if it must be true in case its superaltern is true, and its superaltern must be false in case the subaltern is false.

117. (a) A categorical proposition asserts a relation of inclusion or exclusion, complete or partial, between two classes (collection of all objects which have some specified characteristic in common)

While the ***quantity*** of a categorical proposition is determined by whether or not it refers to all members of its subject class (i.e., the proposition is either universal or particular in quantity); the ***quality*** is determined by whether the asserted class relation is one of inclusion or exclusion (i.e., the proposition is either *affirmative* or *negative* in quality—ARE or ARE NOT)

The four statements are: A, **E**, **I**, and **O**

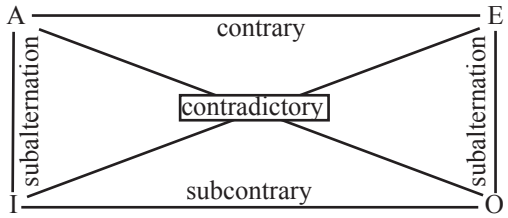
1. A-universal affirmative: All S is P.
2. E-universal negative: No S is P.
3. I-particular affirmative: Some S is P.
4. O-particular negative: Some S is not P.

118. (a) 'All' is a universal inclusive term which does not leave out any unit. So, when all students cleared their exam, the proposition, 'A few students did not clear their exam' is contradictory.

119. (c)

TYPE	FORM	QUANTITY	QUALITY	DISTRIBUTIONS	
A	All S is P	Universal	Affirmative	Distributed	Undistributed
E	No S is P	Universal	Negative	Distributed	Distributed
I	Some S is P	Particular	Affirmative	Undistributed	Undistributed
O	Some S is not P	Particular	Negative	Undistributed	Distributed

120. (c) The square of opposition shown below represents the logical relationships between certain propositions in virtue of their form.



The following hold true:

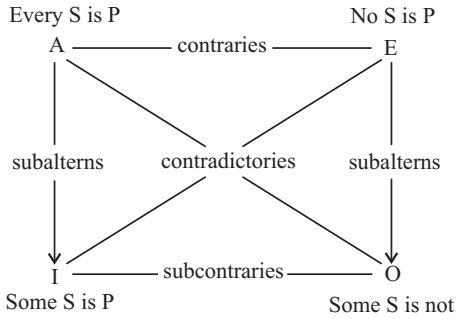
1. Two propositions are *contradictory* when the truth of one implies the falsity of the other, and conversely.
2. Two propositions are *contrary* when they cannot both be true.
3. Two propositions are *subcontrary* when it is impossible for both to be false.
4. Two propositions stand in the relation of *subalternation* when the truth of the first (the *superaltern*) implies the truth of the second (the *subaltern*), but not conversely.

121. (b) Intension and extension indicate the reference of a term or concept. **Intension** indicates the internal content of a term or concept that constitutes its formal definition; while **extension** indicates its range of applicability by naming the particular objects that it denotes. For instance, the intension of 'vehicle' is "means for conveyance on road,"; its extension, all its kinds such as motorcycles, cars, buses, trucks, trailers, and so on.

The **denotation** of a word or phrase is its explicit or direct meaning, or the associations it usually elicits; while the **connotation** of a word or phrase is the associated or secondary meaning suggested or implied rather than explicitly named or described.

So, as per the question, the attributes shared by all to which a term refers is **connotation**; and, attributes of only those objects to which it refers is **the intension**.

122. (b) Observe the following traditional square of opposition.



The theses shown in the square were supplemented with the following:

- Two propositions are contradictory iff they cannot both be true and they cannot both be false.
- Two propositions are contraries iff they cannot both be true but can both be false.
- Two propositions are subcontraries iff they cannot both be false but can both be true.
- A proposition is a subaltern of another iff it must be true if its superaltern is true, and the superaltern must be false if the subaltern is false.

[iff=if and only if]

123. (a) When an argument's premises **assume** the truth of the conclusion, instead of supporting it, a fallacy of begging the question occurs.

Circular argument is a logical fallacy in which the reasoning begins with what has to be ended with. Ignoratio elenchi is a logical fallacy of apparently refuting an opponent while actually disproving something not asserted. *Petitio Principii* is a fallacy in which a conclusion is taken for granted in the premises.

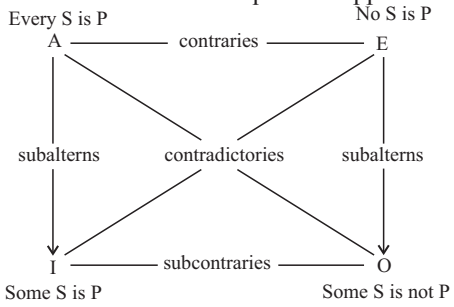
124. (a) All categorical syllogisms have a "mood" and a "figure." The mood of a categorical syllogism is a series of three letters corresponding to the type of proposition (A, E, I, or O) the major premise, the minor premise, and the conclusion are.
The types of the given propositions are as shown below:
Some chairs are curtains (I)
All curtains are bedsheets (A)
Conclusion: Some chairs are bedsheets (I) So, the mood is IAI.

125. (c) Converse of a proposition: Swapping the subject with the predicate.
Thus, the types of proposition have their converse as follows:
A (All S are P): All P are S.
E (No S are P): No P are S.
I (Some S are P): Some P are S.
O (Some S are not P): Some P are not S.

126. (a) The following modes of communication can be employed in the classroom:
- Top-down (issuing instructions and information in a hierarchical structure) when the teacher transacts a lesson using a teacher-centred method such as lecturing
- Iconic (based on images rather than text)
- Abstract (through stories, metaphors, allegories, and examples, with emphasis on the specific rather than the general)

While dissociational communication would cause a disconnect between the teacher and the taught, associational would create association with some and distance others. Symbolic communication would compromise clarity and understanding.

127. (a) Observe the classical square of opposition below:



If **A** proposition is true, **E** proposition— which is its ***contrary***— is false, **O** proposition—which is its ***contradictory***— is false; and **I** proposition—which is its ***subaltern***— is true.

128. (d) Only (c) and (d) are correct.

Subject	Predicate
A: 'birds' refers to all birds; so *distributed*	does not refer to every 'winged creature' e.g., bats, flying fish; so *undistributed*
E: refers to all birds by implication as they are not part of the predicate class; so *distributed*	refers to all wingless creatures by implication that they are not part of the subject class of birds; so *distributed*
I: refers only to some birds; so *undistributed*	refers only to some black things—only those that are birds; so *undistributed*
O: refers only to some birds; so *undistributed*	refers to all 'black things', none of which is in the subject class of "some birds"; so *distributed*

Similarly, for the **O** proposition, "Some girls are not students", the subject term 'girls' is not distributed, but the predicate term, 'students' is distributed.

129. (c) There are two kinds of deductive inference in logic: immediate and mediated inferences. An immediate inference involves an argument consisting of two propositions: one premise and a conclusion; whereas mediated inferences or syllogisms have an argument consisting of three propositions: two premises and a conclusion (with three terms).
Immediate inference has three additional varieties: (i) Conversion is the inference in which the subject and predicate are interchanged; (ii) Obversion is the inference in which the quality of the proposition is changed and the predicate is interchanged with its complement; and, (iii)Contraposition is the inference in which the subject is interchanged with the complement of the predicate and the predicate is interchanged with the complement of the subject.

130. (d) If a term of a categorical proposition refers to every member of a class, it is said to be distributed; if the term is not being used to refer to each and every member of the class, it is undistributed. As shown in the following table, the given proposition is I type, particular affirmative, where the subject as well as the predicate is undistributed.

Type	Form	Quantity	Quality	Distribution	
				Subject	Predicate
A	All S is P	universal	affirmative	distributed	undistributed
E	No S is P	universal	negative	distributed	distributed
I	Some S is P	particular	affirmative	undistributed	undistributed
O	Some S is not P	particular	negative	undistributed	distributed

131. (a) Type A (universal affirmative) and Type E (universal negative) propositions are contraries. Refer to the classical square of opposition shown below and the distribution table provided with answer 35 above.

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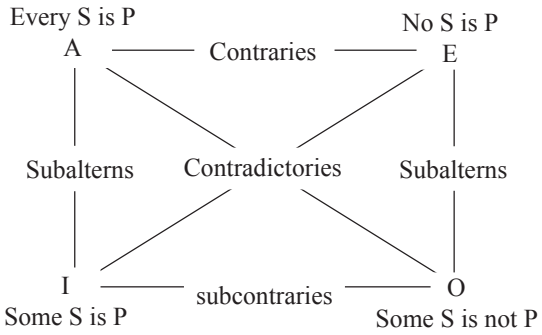
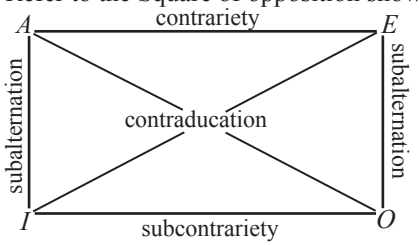


132. (a) Refer to the Square of opposition shown below:



Propositions are contradictory when the truth of one implies the falsity of the other, and conversely.

Propositions are contrary when they cannot *both* be true; but both can be false.

Propositions are subcontrary when it is impossible for both to be *false; but both can be true.*

Two propositions are said to stand in the relation of ***subalternation*** when the truth of the first (the superaltern) implies the truth of the second the subaltern), but *not* conversely.

133. (b) The distinction between deductive and inductive argumentation was first noticed by the Aristotle (384-322 B.C.E.) in ancient Greece. The difference between deductive and inductive arguments does not lie in the words used within the arguments, but rather in the intentions of the arguer. It comes from the relationship the arguer takes there to be between the premises and the conclusion. **If the arguer believes that the truth of the premises *definitely establishes the truth of the conclusion, then the argument is deductive***. If the arguer believes that the truth of the premises provides only good reasons to believe the conclusion is probably true, then the argument is *inductive*. If we who are assessing the quality of the argument have no information about the intentions of the arguer, then we check for both. That is, we assess the argument to see whether it is deductively valid and whether it is inductively strong.

134. (a) Categorical propositions can be of four standard forms: A, E, I or O. A Syllogism is made up of any three of these. Once a syllogism is in standard form, its mood and figure can be determined. The mood and figure uniquely describe the form of the syllogism. Any syllogism of this form will have the same degree of validity or invalidity.

Mood is a list of the three types of propositions making up the syllogism beginning with the major premise and ending with the conclusion.

Figure depends on the arrangement of the middle term in the two premises. There can be four possible figures, easily remembered by the **flying brick** shown below.

M M M M

M_M M_M

With the predicate and subject terms introduced, the figures look as follows:

M-P P-M M-P P-M

S-M S-M M-S M-S

S-P S-P S-P S-P

First Second Third Fourth

Figure Figure Figure Figure

135.(c) Kinesics is the study and interpretation of nonverbal behaviour related to movement of any part of the body or the body as a whole, including gestures, facial expressions, etc., in non-verbal communication .

Proxemics relates to the use of space; **Chronemics** relates to the role of time; and **Haptics** relates to the role of touch in non-verbal communication.

136. (b) Slippery slope fallacy, also known as absurd extrapolation, thin edge of the wedge, camel's nose or domino fallacy, occurs when a relatively insignificant first event is suggested to lead to a more significant event, which in turn leads to a still more significant event, and so on, until the ultimate, concluding significant event is reached. The connections between successive events are absurd and unwarranted.

The connections between the successive events in the given argument, nurses wearing white dress, doctors having private practice, medicines prescribed being expensive and the concluding event 'treatment in the hospital is of poor quality' are absurd. So, it makes a slippery slope fallacy.

Fallacy of Accident is the fallacy of applying a general rule to a particular case whose special circumstances render the rule inapplicable.

Fallacy of composition occurs when one infers, that if something is true of some part of a whole, it must be true of the whole.

Fallacy of division occurs when one reasons, that something that is true of a whole must also be true of all or some of its parts.

137. (c) 'Middle term should be distributed in at least one premise' is the only correct statement among those given.

Categorical syllogisms have exactly three categorical propositions, two of which are premises; and the third is the conclusion. There are exactly three terms, each appearing only twice.

Four rules apply to all valid categorical syllogisms:

Rule 1: The middle term must be distributed in at least one premise.

Rule 2: Any term that is distributed in the conclusion must be distributed in the premises.

Rule 3: The number of negative premises must be equal to the number of negative conclusions.

Rule 4: No particular conclusion can be drawn from exclusively universal premises.

Arguments that pass each of these tests are valid. Those that fail to satisfy even one of the rules are invalid.

138.(a) This commits a deductive fallacy, formal fallacy, logical fallacy or non sequitur (Latin for "it does not follow"). It is a pattern of reasoning rendered invalid by a flaw in its logical structure—a fallacy wherein the conclusion does not follow from the propositions.

139. (b) The argument for Mr X is aimed at evoking pity. Argumentum ad misericordiam is the fallacy of an appeal to invoke pity, commonly referred to as a sob story, in which one tries to persuade someone to agree to an argument or idea by evoking the feelings of pity or guilt from them or making them feel sorry for you. This fallacy can make the other person seem cruel or insensitive if they do not comply. It is also called "Galileo argument" as it refers to the scientist's pitiful trials and house arrest by the Roman Catholic Inquisition (tribunal for heresy) as a result of his heliocentric views.

Fallacy of Accident is the fallacy of applying a general rule to a particular case whose special circumstances render the rule inapplicable.

Fallacy of composition occurs when one infers, that if something is true of some part of a whole, it must be true of the whole.

Fallacy of division occurs when one reasons, that something that is true of a whole must also be true of all or some of its parts.

140. (a) A valid argument is a deductive argument that succeeds in providing decisive logical support.

An argument is VALID in case of the following hypothetical or conditional property:

If all the premises are true, then the conclusion cannot be false; it must be true OR It is impossible for all the premises to be true but the conclusion false.

This suggests that a valid argument cannot have all true premises and a false conclusion. So, if a valid argument does have a false conclusion, it cannot have all true premises. Thus, at least one premise must be false.

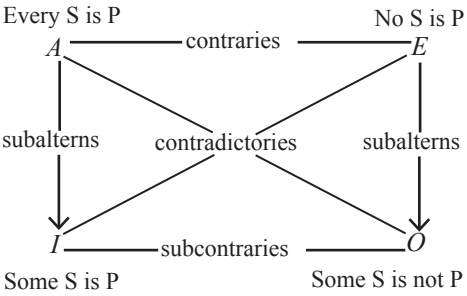
141. (d) Refer to the following table.

Name	Form	Quantity	Quality
A	All S is P	universal	affirmative
E	No S is P	universal	negative
I	Some S is P	particular	affirmative
O	Some S is not P	particular	negative

142. (b) This is an AEE type syllogism where premises 'All X are Y'(A), and 'No Y are Z'(E), lead to the conclusion 'No Z are X' (E). So, the conclusion of the given premises will be 'No book is diary'.

Conversion yields an equivalent proposition (and is hence a valid inference). Option (d) 'No diary is book' is the converse of this conclusion; hence, valid. Also, option (c) 'No book is copy' is the converse of the premise 'No copy is book'; so, it is valid.

143. (c) Observe the classical square of opposition below:



If A proposition is true, **E** proposition—— which is its ***contrary***—— is false, **O** proposition—— which is its ***contradictory***—— is false; and **I** proposition—— which is its ***subaltern***—— is true.

The contrary of 'All poets are dreamers' **(A)** would be 'No poets are dreamers' **(E).**

144. (a) Whether it is valid or invalid is the characteristic feature of all arguments which is tested by determining its truth or falsity on the basis of the Fundamental Principle of Argumentation. The principle says:

An argument is INVALID if and only if it is logically possible for the conclusion to be false even though every premise is assumed to be true.

Testing the validity of Avan argument is a three-step process:

(i) Each premise as well as the conclusion is synmbolized.

(ii) A truth table with a column for each premise and a column for the conclusion is prepared.

(iii) If the truth table has a row where the conclusion column is FALSE while every row in the premise column is TRUE, then the argument is INVALID. Otherwise, the argument is VALID.

145. (c) Distribution is the status of a term in regard to extension.

The subject-term is distributed in statements whose quantity is universal and undistributed in statements whose quantity is particular. The given statement is universal as it includes 'No' with the subject 'Dog'; so, the subject is distributed

In affirmative propositions the predicate-term is always taken particularly (and therefore undistributed) and in negative propositions the predicate is always taken universally (and therefore distributed). The given statement is a negative proposition so, the predicate 'are reptiles' is universal and distributed.

146.(c) Conversion refers to swapping the subject with the predicate in a categorical proposition.

The following chart gives the rules of conversion for the 4 types of categorical propositions:

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Proposition	Converse	Whether valid/true
(A) All S are P.	All P are S. Some P are S*.	No by limitation,
(E) No S is P.	No P is S.	Yes
(I) Some S are P.	Some P are S.	Yes
(O) Some S are not P	Some P are not S.	No

(*In traditional logic, the A proposition has a converse by limitation which is the subaltern of the invalid A-converse; i.e., the corresponding I proposition. The converse by limitation is implied by the original but is not (usually) equivalent to it.

147. (c) The major term here is 'gentlemen'.

Categorical Syllogism is a deductive argument consisting of three propositions/statements—two premises (a major and a minor) and the conclusion. There are three terms—the major term, the minor term, and the middle term—in the Subject and Predicate of these statements/propositions.

Major term—the subject of the major premise and predicate of the conclusion.

Minor term—the subject of the conclusion.

Middle term—appears as a subject or predicate in both premises but excluded from the conclusion.

148. (b) A definition put forward to resolve a dispute by influencing attitudes or stirring emotions is called persuasive.

149. (b)

CHAPTER 22

Evaluating and Distinguishing Deductive and Inductive Reasoning

Deductive reasoning, or deduction, is making an inference based on widely accepted facts or premises. If a beverage is defined as "drinkable through a straw," one could use deduction to determine soup to be a beverage.

Inductive reasoning, or induction, is making an inference based on an observation, often of a sample. You can induce that the soup is tasty if you observe all of your friends consuming it.

Abductive reasoning, or abduction, is making a probable conclusion from what you know. If you see an abandoned bowl of hot soup on the table, you can use abduction to conclude the owner of the soup is likely returning soon.

Deduction is generally defined as "the deriving of a conclusion by reasoning." Its specific meaning in logic is "inference in which the conclusion about particulars follows necessarily from general or universal premises." Or we can say that deduction — or the process of deducing is the formation of a conclusion based on generally accepted statements or facts. Deductive reasoning always follows necessarily from general or universal premises.

Induction is a method of reasoning involving an element of probability. In logic, induction refers specifically to "inference of a generalized conclusion from particular instances." In other words, it means forming a generalization based on what is known or observed. So it always follows the particular to general path.

Abduction, is defined as "a syllogism in which the major premise is evident but the minor premise and therefore the conclusion only probable." Basically, it involves forming a conclusion from the information that is known. A familiar example of abduction is a detective's identification of a criminal by piecing together evidence at a crime scene.

EXERCISE

1. Which of the following statements is/are absolutely impossible ? **[December-2004]**

(A) A woman giving birth to her own grandchild

(B) A man attending his own funeral

(C) The Sun not rising in the East some day

(D) Cars running without petrol

Choose the correct answer from the code given below :

Codes :

(a) (A) and (B) (b) (C) and (D)

(c) (B) (d) (A)

2. Which of the following are incorrect ways of arguing? **[December-2004]**

(A) If horses are cows, and if cows are sheep, then all horses must be sheep.

(B) If top actors are famous, and Shah Rukh Khan is famous, then Shah Rukh Khan is a top actor

(C) Lata is the second sister of Raju, hence Raju is the second brother of Lata

(D) A is not equal to B, but B is equal to C, hence A is equal to C.

Choose the correct answer from the code given below :

Codes:

(a) (A), (B) and (C) (b) (A), (C) and (D)

(c) (B), (C) and (D) (d) (A), (B) and (D)

3. **Statements :** I. All students are ambitious

II. All ambitious persons are hard working

Conclusions : (i) All students are hard-working

(ii) All hardly working people are not ambitious

Which of the following is correct ? **[December-2005]**

(a) Only (i) is correct

(b) Only (ii) is correct

(c) Both (i) and (ii) are correct

(d) Neither (i) nor (ii) is correct

4. **Statement :** Most students are intelligent

Conclusions : (i) Some students are intelligent

(ii) All students are not intelligent

Which of the following is implied? **[December-2005]**

(a) Only (i) is implied

(b) Only (ii) is implied

(c) Both (i) and (ii) are implied

(d) Neither (i) nor (ii) is implied

5. **Statement :** Most labourers are poor

Conclusions : (i) Some labourers are poor

(ii) All labourers are not poor

Which of the following is implied? **[December-2005]**

(a) Only (i) is implied

(b) Only (ii) is implied

(c) Both (i) and (ii) are implied

(d) Neither (i) nor (ii) is implied

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6. In the following question a statement is followed by two conclusions. Taking the statement to be true. Decide which of the given conclusions definitely follows from the given statements. **[June-2005]**

Statements: illiteracy in India is the root cause of slow pace of economic development

Conclusion:

I. Development is directly related with illiteracy.

II. Pace of economic development in India is slow

(a) Only conclusion I follows

(b) Only conclusion II follows

(c) Both I and II follows

(d) Neither I nor II follows

7. Read the following statement carefully: If a person has studied in foreign language. He is definitely not a patriot. **[June-2005]**

(a) This is a correct statement

(b) This statement is a suggestion

(c) This is wrong statements

(d) This is a biased statement

8. Which of the following conclusions is logically valid based on statement given below? **[June-2006]**

Statement : Most teachers are hard working.

Conclusions :

(I) Some teachers are hard working.

(II) Some teachers are not hard working.

(a) Only (I) is implied

(b) Only (II) is implied

(c) Both (I) and (II) are implied

(d) Neither (I) nor (II) is implied

9. Given below are two statements (A) and (B) followed by two conclusions (i) and (ii). Considering the statements to be true, indicate which of the following conclusions logically follow from the given statements by selecting one of the four response alternatives given below the conclusion : **[June-2006]**

Statements:

(A) all businessmen are wealthy.

(B) all wealthy people are hard working.

Conclusions:

(i) All businessmen are hard working.

(ii) All hardly working people are not wealthy

(a) Only (i) follows

(b) Only (ii) follows

(c) Only (i) and (ii) follows

(d) Neither (i) nor (ii) follows

10. Which of the following conclusions is logically valid based on statement given below? **[June-2006]**

Statement : Most of the Indian states existed before independence.

Conclusions:

(I) Some Indian States existed before independence.

(II) All Indian States did not exist before independence.

(a) only (I) is implied

(b) only (II) is implied

(c) Both (I) and (II) are implied

(d) Neither (I) nor (II) is implied

11. Which of the following statement/s are ALWAYS FALSE? **[December-2006]**

(i) The sun will not rise in the East some day.

(ii) A wooden table is not a table.

(iii) Delhi city will be drowned under water.

(iv) Cars run on water as fuel. Choose the correct answer from the code given below:

Code:

(a) (i), (iii) and (iv) (b) Only (iii)

(c) (i), (ii) and (iii) (d) (ii) alone

12. From the given four statements, select the two which cannot be true but yet both can be false. **[June-2007]** Choose the right pair:

(i) All men are mortal (ii) Some men are mortal

(iii) No man is mortal (iv) Some men are not mortal

(a) (i) and (ii) (b) (iii) and (iv)

(c) (i) and (iii) (d) (ii) and (iv)

13. Logical arguments are based on: **[December-2007]**

(a) Scientific reasoning (b) Customary reasoning

(c) Mathematical reasoning (d) Syllogistic reasoning

14. Deductive reasoning proceeds from: **[June-2008]**

(a) general to particular

(b) particular to general

(c) one general conclusion to another general conclusion

(d) one particular conclusion to another particular conclusion

15. **Assertion (A) :** Man is a rational being. **[June-2008]**

Reason (R) : Man is a social being.

(a) Both (A) and (R) are true and (R) is the correct explanation of (A)

(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(c) (A) is true but (R) is false

(d) (A) is false but (R) is true

16. Inductive reasoning is based on or presupposes **[December-2009]**

(a) uniformity of nature (b) laws of nature

(c) unity of nature (d) God created the world

17. Lakshmana is a morally good person because **[June-2010]**

(a) he is religious (b) he is educated

(c) he is rich (d) he is rational

18. Two statements I and II given below are followed by two conclusions (A) and (B). Supposing the statements are true, which of the following conclusions can logically follow? **[June-2010]**

I. Some religious people are morally good.

II. Some religious people are rational.

Conclusions :

A. Rationally religious people are good morally.

B. Non-rational religious persons are not morally good.

(a) Only (A) follows.

(b) Only (B) follows.

(c) Both (A) and (b) follow.

(d) Neither (A) nor (B) follows.

19. Certainty is **[June-2010]**
(a) an objective fact (b) emotionally satisfying
(c) logical (d) ontological

20. If the statement 'all students are intelligent' is true, which of the following statements are false ? **[December-2010]**
(i) No students are intelligent.
(ii) Some students are intelligent.
(iii) Some students are not intelligent.
(a) (i) and (ii) (b) (i) and (iii)
(c) (ii) and (iii) (d) (i) only

21. A reasoning where we start with certain particular statements and conclude with a universal statement is called **[December-2010]**
(a) Deductive Reasoning
(b) Inductive Reasoning
(c) Abnormal Reasoning
(d) Transcendental Reasoning

22. If the statement 'some men are cruel' is false, which of the following statements/statement are/is true ? **[June-2011]**
(i) All men are cruel. (ii) No men are cruel.
(iii) Some men are not cruel.
(a) (i) and (iii) (b) (i) and (ii)
(c) (ii) and (iii) (d) (iii) only

23. If the proposition "Vegetarians are not meat eaters" is false, then which of the following inferences is correct ? Choose from the codes given below : **[December-2011]**
1. "Some vegetarians are meateaters" is true.
2. "All vegetarians are meat eaters" is doubtful.
3. "Some vegetarians are not meat eaters" is true.
4. "Some vegetarians are not meat eaters" is doubtful.

Codes :
(a) 1, 2 and 3 (b) 2, 3 and 4
(c) 1, 3 and 4 (d) 1, 2 and 4

24. Inductive logic studies the way in which a premise may **[December-2011]**
(a) support and entail a conclusion
(b) not support but entail a conclusion
(c) neither support nor entail a conclusion
(d) support a conclusion without entailing it

25. If the proposition "All men are not mortal" is true then which of the following inferences is correct ? Choose from the code given below : **[June-2012]**
1. "All men are mortal" is true.
2. "Some men are mortal" is false.
3. "No men are mortal" is doubtful.
4. "All men are mortal" is false.

Codes :
(a) 1, 2 and 3 (b) 2, 3 and 4
(c) 1, 3 and 4 (d) 1 and 3

26. If the statement 'most of the students are obedient' is taken to be true, which one of the following pair of statements can be claimed to be true? **[December-2012]**
I. All obedient persons are students.
II. All students are obedient.
III. Some students are obedient.
IV. Some students are not disobedient.

Codes:
(a) I & II (b) II & III
(c) III & IV (d) II & IV

27. Consider the Assertion–I and Assertion–II and select the right code given below : **[December-2012]**
Assertion–I: Even Bank-lockers are not safe. Thieves can break them and take away your wealth. But thieves can not go to heaven. So you should keep your wealth in heaven.
Assertion–II: The difference of skin-colour of beings is because of the distance from the sun and not because of some permanent traits. Skin-colour is the result of body's reaction to the sun and its rays.

Codes :
(a) Both the assertions-I and II are forms of argument.
(b) The assertion-I is an argument but the assertion-II is not.
(c) The assertion-II is an argument but the assertion-I is not.
(d) Both the assertions are explanations of facts.

28. Consider the statement which is followed by two arguments (I) and (II) : **[June-2013]**
Statement : Should persons with criminal background be banned from contesting elections ?

Arguments:
(I) Yes, it will decriminalise politics.
(II) No, it will encourage the ruling party to file frivolous cases against their political opponents.
(a) Only argument (I) is strong.
(b) Only argument (II) is strong.
(c) Both the arguments are strong.
(d) Neither of the arguments is strong.

29. Inductive reasoning presupposes **[June-2013]**
(a) unity in human nature
(b) integrity in human nature
(c) uniformity in human nature
(d) harmony in human nature

30. If the statement 'some men are honest' is false, which among the following statements will be true. **[June-2013]**
Choose the correct code given below :
(i) All men are honest.
(ii) No men are honest.
(iii) Some men are not honest.
(iv) All men are dishonest.

Codes :
(a) (i), (ii) and (iii) (b) (ii), (iii) and (iv)
(c) (i), (iii) and (iv) (d) (ii), (i) and (iv)

31. What is equivalent of the statement 'All atheists are pessimists' ? **[September-2013]**
(a) All non-pessimists are nonatheists.
(b) All non-atheists are nonpessimists.
(c) All pessimists are atheists.
(d) None of the above.

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32. Among the following statements two are contradictory to each other. Select the correct code that represents them : **[June-2015]**

Statements :

(A) All poets are philosophers.

(B) Some poets are philosophers.

(C) Some poets are not philosophers.

(D) No philosopher is a poet.

Codes :

(a) (A) and (B) (b) (A) and (D)

(c) (A) and (C) (d) (B) and (C)

33. Inductive reasoning is grounded on : **[June-2015]**

(a) Integrity of nature (b) Unity of nature

(c) Uniformity of nature (d) Harmony of nature

34. If we want to seek new knowledge of facts about the world, we must rely on reason of the type: **[June-2015]**

(a) Inductive (b) Deductive

(c) Demonstrative (d) Physiological

35. If the proposition 'No men are honest' is taken to be false which of the following proposition/ propositions can be claimed certainly to be true ? **[December-2015]**

Propositions :

(a) All men are honest (b) Some men are honest

(c) Some men are not honest (d) No honest person is man

36. Consider the following **Assertion (A)** and **Reason (R)** and select the correct code given below: **[December-2015]**

Assertion (A) : No man is perfect.

Reason (R) : Some men are not perfect.

(a) Both (A) and (R) are true but (R) does not provide sufficient reason for (A).

(b) Both (A) and (R) are true and (R) provides sufficient reason for (A).

(c) (A) is true but (R) is false.

(d) (A) is false but (R) is true.

37. Given below are two premises and four conclusions are drawn from them (taking singly or together). Select the code that states the conclusions validly drawn. **[July-2016]**

Premises:

(i) All religious persons are emotional.

(ii) Ram is a religious person.

Conclusions:

(A) Ram is emotional,

(B) All emotional persons are religious.

(C) Ram is not a non-religious person.

(D) Some religious persons are not emotional.

Codes:

(a) (A), (B), (C) and (D) (b) (A) only

(c) (A) and (C) only (d) (B) and (C) only

38. Given below are some characteristics of reasoning. Select the code that states a characteristic which is not of deductive reasoning: **[January-2017]**

(a) The conclusion must be based on observation and experiment.

(b) The conclusion should be supported by the premise/premises.

(c) The conclusion must follow from the premise/premises necessarily.

(d) The argument may be valid or invalid.

39. If the statement 'None but the brave wins the race' is false which of the following statements can be claimed to be true? **[November-2017]**

Select the correct code :

(a) All brave persons win the race.

(b) Some persons who win the race are not brave.

(c) Some persons who win the race are brave.

(d) No person who wins the race is brave.

40. Given below are four statements. Among them two are related in such a way that they can both be true but they cannot both be false. Select the code that indicates those two statements : **[November-2017]**

Statements :

(A) Honest people never suffer.

(B) Almost all honest people do suffer.

(C) Honest people hardly suffer.

(D) Each and every honest person suffers.

Codes :

(a) (A) and (B) (b) (A) and (C)

(c) (A) and (D) (d) (B) and (C)

41. Which one among the following is a presupposition in inductive reasoning ? **[July-2018]**

(a) Law of identity (b) Unchangeability in nature

(c) Harmony in nature (d) Uniformity of nature

42. 'No man are mortal' is contradictory of: **[June-2009]**

(a) Some man are mortal (b) Some man are not mortal

(c) All men are mortal (d) No mortal is man

43. **Assertion (A) :** There are more laws on the books today than ever before, and more crimes being committed than ever before.

Reason (R) : Because to reduce crime we must eliminate the laws.

Choose the correct answer from below: **[June-2012]**

(a) (A) is true, (R) is doubtful and (R) is not the correct explanation of (A).

(b) (A) is false, (R) is true and (R) is the correct explanation of (A).

(c) (A) is doubtful, (R) is doubtful and (R) is not the correct explanation of (A).

(d) (A) is doubtful, (R) is true and (R) is not the correct explanation of (A).

44. In which method of arriving at knowledge, the emphasis is on both proceeding from particular to general and from general to particular in a combined way? **[20th June 2019-IInd Shift]**

(a) Inductive method (b) Deductive method

(c) Scientific method (d) Analogical method

45. The reasoning which would be helpful in finding new knowledge of facts about the world is **[26th June 2019-IInd Shift]**

(a) Speculative (b) Inductive

(c) Deductive (d) Analogical

46. Identify the reasoning in the argument: **'Writing on paper is similar to writing on the board'.** **[21st June 2019-Ist Shift]**

(a) Deductive (b) Hypothetical

(c) Analogical (d) Inductive

47. Identify the reasoning in the argument: 'Pre-active stage of classroom teaching is important just as pre-learning preparation stage of communication'.

[26th June 2019-Ist Shift]

(a) Hypothetical (b) Deductive
(c) Inductive (d) Analogical

48. Product of two consecutive integers is divisible by 2. Therefore 4 X 5 (=20) is divisible by 2. This is an example of which type of Reasoning? **[2nd Dec. 2019-IInd Shift]**

(a) Abductive (b) Informal
(c) Inductive (d) Deductive

49. The product of any three consecutive integers is divisible by 6. Therefore, 3 X 4 X 5 (=60), is divisible by 6? Which type of reasoning is embodied here'?

[2nd Dec. 2019-Ist Shift]

(a) Deductive Reasoning (b) Inductive Reasoning
(c) Non-verbal Reasoning (d) Abductive Reasoning

50. Match correctly the contribution / concept of Column-II with the names of the thinkers given in Column-I

[5th Dec. 2019-Ist Shift]

Column-I	Column-II
(A) Karl Popper	(i) Inductive method
(B) T.S. Kuhn	(ii) Against the method
(C) Paul Feyerabend	(iii) Paradigm
(D) Francis Bacon	(iv) Falsification

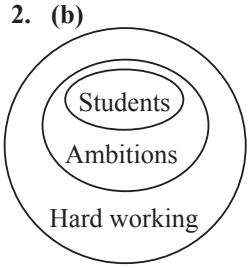
Choose the most appropriate option from those given below:

(a) (a)-(ii), (b)-(iii), (c)-(i), (d)-(iv)
(b) (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)
(c) (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)
(d) (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)

HINTS & EXPLANATION

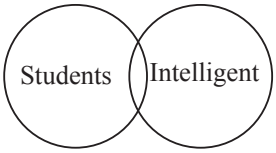
1. (a) 2. (b)

3. (c)



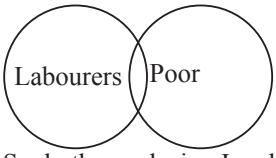
So, both conclusion I and II are correct.

4. (c)



So, both conclusion I and II are implied.

5. (c)

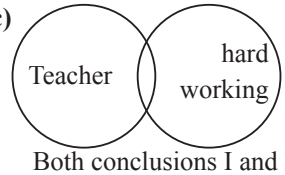


So, both conclusion I and II are implied.

6. (b) Pace of economic development in India is slow.

7. (d) The statement 'If a person has studied in foreign language, he is definitely not a patriot' is biased.

8. (c)



Both conclusions I and II are implied.

9. (a) Only (i) follows.

10. (b) According to the statement most of the Indian states existed before independence meaning not all the Indian States existed before independence. Therefore, conclusion II is logically valid.

11. (d) 12. (b)

13. (d) Logical arguments are based on syllogistic reasoning.

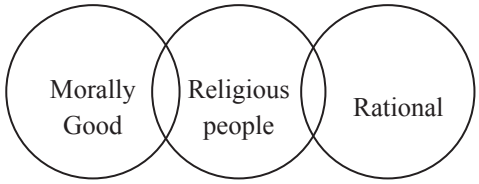
14. (a) Deductive reasoning is a logical process in which a conclusion is based on the concordance of multiple premises that are generally assumed to be true. Deductive reasoning is sometimes referred to as top-down logic. Its counterpart, inductive reasoning, is sometimes referred to as bottom-up logic.

15. (b)

16. (b) Inductive reasoning is a logical process in which multiple premises, all believed true or found true most of the time, are combined to obtain a specific conclusion. Inductive reasoning is often used in applications that involve prediction, forecasting, or behavior.

17. (a)

18. (d)



So Neither Conclusion (A) nor Conclusion (B) follows.

19. (b) Certainty is emotionally Satisfying.

20. (b)

21. (a) Through deductive reasoning we can start with renexal statement and come to the universal statement.

22. (b) 23. (a)

24. (d) An inductive logic is a logic of evidential support. In a deductive logic, the premises of a valid deductive argument logically entail the conclusion, where logical entailment means that every logically possible state of affairs that makes the premises true must make the conclusion truth as well.

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25. (b) Correct codes are–
- "Some men are mortal" is false.
- "No men are mortal" is doubtful.
- "All men are mortal" is false.

26. (c)

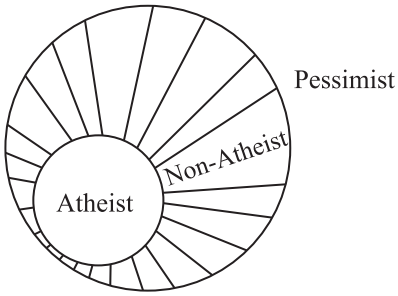
27. (b) The assertion-I is an argument but the assertion-II is not.

28. (a) Only argument (I) is strong.

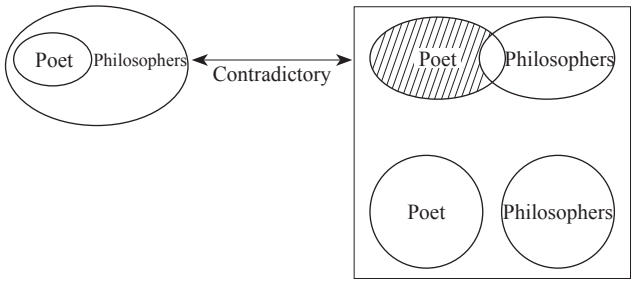
29. (c) Inductive reasoning presupposes uniformity in human nature.

30. (b) According to the statement "some man are honest" is false, that means no man are honest, & some man are not honest & all man are dishonest.

31. (a)



32. (c) (A) All poet are philosophers.
(C) Some poet are not philosophers.



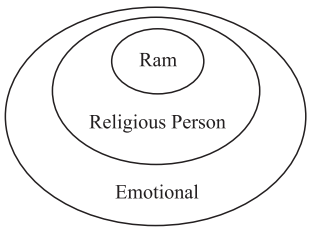
33. (c) In inductive agruments, focus on the inference. When a conclusion relies upon an inference and contains new information not found in the premises, the reasoning is inductive. For example, if premises were established that the defendant slurred his words, stumbled as he walked, and smelled of alcohol, you might reasonably infer the conclusion that the defendant was drunk. This is inductive reasoning. In an inductive argument the concusion is, at best, probable. The conclusion is not always true when the premises are true. The probability of the conclusion depends on the strength of the inference from the premises, Thus, when dealing with inductive reasoning, pay special attention to the inductive leap or inference by which the conclusion follows from the premises.

34. (a) Inductive reasoning (as opposed to deductive reasoning or abductive reasoning) is a method of reasoning in which the premises are viewed as supplying some evidence for the truth of the conclusion.

35. (b)

36. (a)

37. (c)



Hence, Ram is emotional and Ram is not a non-religions person

38. (b) Deductive reasoning is a logical process in which a conclusion is based on the concordance of multiple premises that are generally assumed to be true.

39. (b) 'Some persons who won the race are brave' is a true conclusion.

40. (d)

41. (d) Uniformity of nature is a presupposition in inductive reasoning.

42. (a)

43. (a) (A) is true, (R) is doubtful and (R) is not the correct explanation of (A).

44. (c) Inductive method: from specific premises to particular conclusion.
Deductive method: from particular premises to specific conclusion.
Analogical method: citing similarities between two systems to support conclusion.
Scientific method: Combination of inductive and deductive methods....

45. (b) Deductive reasoning starts with a general statement, premise or hypothesis, and examines the possibilities to reach a specific, logical conclusion. "Inductive inference goes from the specific to the general. We make many specific observations, discern a pattern from them, make a generalization, and infer an explanation or a theory. Speculative reasoning starts with a hypothesis, and makes purely theoretical and logical analysis to speculate or predict an outcome. Analogical reasoning relies upon an analogy, citing accepted similarities between two systems to support the conclusion that some further similarity exists.

46. (c) Analogical reasoning relies upon analogy, citing accepted similarities between two systems to support the conclusion that some further similarity exists. In the given argument, the term 'is similar to' clearly shows the comparison between writing on paper and writing on the board.

47. (d) Analogical reasoning relies upon analogy, citing accepted similarities between two systems to support the conclusion that some further similarity exists. In the given argument, the term 'jus as' clearly shows the comparison between the pre-active stage of classroom teaching and pre-learning preparation stage of communication.

48. (d)

49. (a) Out of three consecutive numbers, one number is at least even number and at least one number is divisible by 3. Now any number that are divisible by 2 and 3, must be divisible by 6. Such type of reasoning is called deductive reasoning; Deductive reasoning is a process of reaching a necessary conclusion from given facts or hypothesis.

50. (c)

CHAPTER 23

Analogies

Analogy is an inductive mechanism based on structured comparisons of mental representations. It is an important special case of role-based relational reasoning, in which inferences are generated on the basis of patterns of relational roles. Analogical reasoning is a complex process involving retrieval of structured knowledge from long-term memory, representing and manipulating role-filler bindings in working memory, identifying elements that play corresponding roles, generating new inferences, and learning abstract schemas. For empirical analogies, analogical inference is guided by causal knowledge about how the source analog operates. Simpler types of relation-based transfer can be produced by relational priming.

Analogy is a cognitive process of transferring information or meaning from a particular subject (the analog, or sources) to another (the target T), or a linguistic expression corresponding to such a process. In a narrower sense, analogy is an inference or an argument from one particular to another particular, as opposed to deduction, induction, and abduction, in which at least one of the premises, or the conclusion, is general rather than particular in nature. The term analogy can also refer to the relation between the source and the target themselves, which is often (though not always) a similarity, as in the biological notion of analogy.

POSITIVE ANALOGY

Let P stand for a list of accepted propositions P1, …, Pn about the source domain S. Suppose that the corresponding propositions P*1, …, P*n, abbreviated as P*, are all accepted as holding for the target domain T, so that P and P* represent accepted (or known) similarities. Then we refer to P as the positive analogy.

NEGATIVE ANALOGY

Let A stand for a list of propositions A1, …, Ar accepted as holding in S, and B* for a list B1*, …, Bs* of propositions holding in T. Suppose that the analogous propositions A* = A1*, …, Ar* fail to hold in T, and similarly the propositions B = B1, …, Bs fail to hold in S, so that A, ~A* and ~B, B* represent accepted (or known) differences. Then we refer to A and B as the negative analogy.

NEUTRAL ANALOGY

The neutral analogy consists of accepted propositions about S for which it is not known whether an analogue holds in T.

Hypothetical analogy

The hypothetical analogy is simply the proposition Q in the neutral analogy that is the focus of our attention.

PLAUSIBLE REASONING

It is a method of deriving new conclusions from given known premises, a method different from the classical syllogistic argumentation methods of Aristotelian two-valued logic. The syllogistic style of argumentation is illustrated by the oft-quoted argument "All men are mortal, Akhil is a man, and therefore, Akhil is mortal." In contrast, consider the statement "if it is raining then it is cloudy." The only logical inference that one can draw from this is that "if it is not cloudy then it is not raining." But ordinary people in their everyday lives would conclude that "if it is not raining then being cloudy is less plausible," or "if it is cloudy then rain is more plausible." The unstated and unconsciously applied reasoning, arguably incorrect, that made people come to their conclusions is typical of plausible reasoning.

CONNOTATIONS AND DENOTATIONS OF TERMS

In logic and semantics, *connotation* is roughly synonymous with intension. Connotation is often contrasted with denotation, which is more or less synonymous with extension. Alternatively, the connotation of the word may be thought of as the set of all its possible referents (as opposed to merely the actual ones). A word's *denotation* is the collection of things it refers to; its connotation is what it implies about the things it is used to refer to. The denotation of dog is (something like) four-legged canine carnivore. So saying, "You are a dog" would connote that you were ugly or aggressive rather than literally denoting you as a canine.

Fact

A fact is verifiable. We can determine whether it is true by researching the evidence.

Opinion

An opinion is a judgment based on facts, an honest attempt to draw a reasonable conclusion from factual evidence.

Belief

Unlike an opinion, a belief is a conviction based on cultural or personal faith, morality, or values. They cannot be disproved or even contested in a rational or logical manner.

Prejudice

Another kind of assertion that has no place in serious argumentation is prejudice, a half-baked opinion based on insufficient or unexamined evidence.Unlike a belief, a prejudice is testable: it can be contested and disproved on the basis of facts.

TYPES OF FALLACIES

Non Sequitur: When a conclusion is supported only by extremely weak reasons or by irrelevant reasons,

Example: Nuclear disarmament is a risk.

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Masked-Man Fallacy

In philosophical logic, the masked-man fallacy (also known as the intentional fallacy and the epistemic fallacy) is committed when one makes an illicit use of *Leibniz's law* in an argument. *Leibniz's law* states that if A and B are the same object, then A and B are indiscernible (that is, they have all the same properties). By *modus tollens*, this means that if one object has a certain property, while another object does not have the same property, the two objects cannot be identical. The fallacy is "epistemic" because it postulates an immediate identity between a subject's knowledge of an object with the object itself, failing to recognize that Leibniz's Law is not capable of accounting for intentional contexts.

Example:

The name of the fallacy comes from the example:

Premise 1: I know who Bob is.

Premise 2: I do not know who the masked man is

Conclusion: Therefore, Bob is not the masked man.

The premises may be true and the conclusion false if Bob is the masked man and the speaker does not know that. Thus the argument is a fallacious one.

Bad Reason Fallacy

The bad reasons fallacy stems from the claim that because the reason(s) given for a certain conclusion are bad therefore the conclusion must also be incorrect. This fallacy supposes that it is not possible to give a bad reason for a correct conclusion. In fact, it is possible to give bad reasoning for a valid conclusion.

Example:

Kiwi can not fly so it is not a bird.

Syllogistic Fallacies

When logical fallacies occur in the syllogisms of deductive reasoning. This occurs with a reference to something general, and then makes a conclusion about something more specific.

Example:

All sharks are fish (All S are P.)

All salmon are fish (All x are P).

Therefore all salmon are sharks. (All x are P.)

Quantification Fallacies

Error in logic where the quantifiers of the premises are in contradiction to the conclusions quantifiers. An example of such a fallacy is when the argument has a universal premise and a particular conclusion. That is, the premise(s) do not justify the conclusion(s).

Example:

All monkeys love some dogs.

Begging the Question

A form of circular reasoning in which a conclusion is derived from premises that presuppose the conclusion. Normally, the point of good reasoning is to start out at one place and end up somewhere new, namely having reached the goal of increasing the degree of reasonable belief in the conclusion. The point is to make progress, but in cases of begging the question there is no progress.

Example:

"Women have rights," said the Bullfighters Association president. "But women shouldn't fight bulls because a bullfighter is and should be a man."

False Dilemma

A reasoner who unfairly presents too few choices and then implies that a choice must be made among this short menu of choices is using the False Dilemma Fallacy, as does the person who accepts this faulty reasoning.

Example:

In a restaurant a vegetarian person got all non veg items.

No True Scotsman

This error is a kind of Ad Hoc Rescue of one's generalization in which the reasoner re-characterizes the situation solely in order to escape refutation of the generalization.

Example:

A: All XYZ are loyal and brave.

B: But Bravo over there is a XYZ, and he was arrested by his commanding officer for running from the enemy.

A: Well, if that's right, it just shows that Bravo wasn't a TRUE XYZ.

Ambiguity

Any fallacy that turns on ambiguity. The fallacies of Amphiboly, Accent, and Equivocation are examples of ambiguity. Amphiboly is ambiguity of syntax. Equivocation is ambiguity of semantics. Accent is ambiguity of emphasis.

Ad Hominem

The ad hominem attack is a logical fallacy associated with trying to undermine the opponent's arguments by personal attacks, through attacking their character or skill level, etc. The ad hominem attack uses an accepted fact about a person to undermine their credibility despite the lack of causal connection between the two parts of the argument.

Example:

Mr Z claims that this was an accident, but we know Mr Z to be a liar, so we can't take his word for it.

Even though Mr Z may be a liar, his character does not automatically make anything he says untrue.

Anecdotal

The anecdotal fallacy uses a personal experience or an isolated example instead of a sound argument.

Example:

Mr A thinks smoking does not affect life expectancy since hir grandmother smoked for 4 decades and lived to be 87.

The fact that Mr A's grandmother did not affected by cancer or other kind of disease, does not mean that someone else with the same behavior would have had the same result.

Appeal to Ridicule

Appeal to Ridicule is an informal fallacy which claims an argument to be ridiculous or absurd. The fallacy uses this claim in an attempt to invalidate the argument since it is not worth entertaining.

Appeal to ridicule can be used in conjunction with other fallacies such as appeal to emotion. Sarcasm can also be used as a means of appeal to ridicule.

Example:

Everyone should wear seatbelts. We should also wear neck guard and sleep in a bunker.

False Cause & False Attribution

False cause refers to an argument where someone cites sequential events as evidence that the first event caused the second. False attribution happens when someone appeals to irrelevant, biased, or unqualified information.

Example:

False Cause: I eat fruits for breakfast every day. One day I skipped my fruit, and my car was broken into. I have not missed a day of fruit breakfast since.

False Attribution: Amit given me this book that proved scientists have empirical evidence for the existence of Yati, but I lost the book and don't remember the title.

Ignoratio Elenchi

Also called Irrelevant Conclusion, the ignoratio elenchi fallacy reaches a relevant conclusion but misses the point. Though the claims and conclusion may be logically valid, they do not address the point in question.

Example

Hippos can't be dangerous to humans, because they are so calm. The fact is exactly opposite of it as Hippos are responsible for one of the largest humans kills in Africa.

Appeal to Tradition

As the name suggest this fallacy relies on tradition to prove a point, arguing that a thesis must be correct because it has traditionally been so.

Example:

"Everyone in our family has attended the University of Delhi, so you must do the same."

Tu Quoque

Tu quoque is a fallacy answering criticism with criticism, or turning the argument back around on the other person. It also applied the logic that because someone has done something, that it justifies someone else doing the same thing.

Example:

A: You cheated on your exam. Don't you know that is wrong?

B: Didn't you cheat on your exam last time?

EXERCISE

1. Which of the following statements say the same thing?

[December-2006]

(i) "I am a teacher" (said by Arvind)
(ii) "I am a teacher" (said by Binod)
(iii) "My son is a teacher" (said by Binod's father)
(iv) "My brother is a teacher" (said by Binod's sister)
(v) "My brother is a teacher" (said by Binod's only sister)
(vi) "My sole enemy is a teacher" (said by Binod's only enemy)

Choose the correct answer from the code given below:

Codes:

(a) (i) and (ii) (b) (ii), (iii), (iv) and (v)
(c) (ii) and (vi) (d) (v) and (vi)

2. Which of the following is an analogous statement ?

[December-2009]

(a) Man is like God
(b) God is great
(c) Gandhiji is the Father of the Nation
(d) Man is a rational being.

3. Reasoning by analogy leads to **[June-2012]**

(a) certainty (b) definite conclusion
(c) predictive conjecture (d) surety

4. Superiority of intellect depends upon its power of concentration on one theme in the same way as a concave mirror collects all the rays that strike upon it into one point. What type of reasoning is entailed in the above statement ?

[July-2018]

(a) Mathematical (b) Psychological
(c) Analogical (d) Deductive

5. A fallacy in which an opponent's position is depicted as being more extreme or unreasonable than is justified by what was actually asserted is called

[2nd Dec. 2019-Ist Shift]

(a) Argumentum ad Baculum
(b) The Red Herring
(c) Argumentum ad Hominem
(d) Straw Man

6. "Everyone is going to the party. You should go too." This inference commits which kind of fallacy?

[2nd Dec. 2019-IInd Shift]

(a) Ad Populum (b) Equivocation
(c) Ad Verecundiam (d) Ad Ignorantiam

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HINTS & EXPLANATION

1. (b) Statement (ii), (iii) (iv) and (v) have same meaning.

2. (d) An analogous statement just compares two things. That's where the word "analogy" comes from. A common example I found on several websites is: Horses are to old societies, as cars are to present societies.

3. (c) Reasoning by analogy leads to predictive conjecture.

4. (c) Analogical

Analogical reasoning is the process of drawing similarities between two systems to support the conclusion.

Mathematical reasoning employs analysis, logic and critical thinking to arrive at a conclusion.

Psychological reasoning pertains to understanding others' actions by deciphering the mental states that underlie those actions.

Deductive reasoning is the process of reaching a logical conclusion from one or more premises/ statements.

5. (d) **Straw man fallacy** is giving the impression of refuting an opponent's argument, while actually refuting an argument that was not presented by that opponent; in effect making the opponent's argument/position/stand seem more extreme or unreasonable than is justified by what was actually asserted.

Argumentum ad baculum is appealing to force or the threat of force to bring about the acceptance of a conclusion.

Red Herring fallacy is introducing irrelevant topic in an argument to divert the attention of listeners or readers from the original issue.

Argumentum ad hominem is avoiding the genuine discussion of the topic at hand by attacking the character, motive, or other attribute of the opponent.

6. (a) Ad populum fallacy involves concluding a proposition to be true because many or all people believe it.

Equivocation fallacy involves using an ambiguous term which has more than one sense and hence, may be misinterpreted, and may mislead.

Ad verecundiam fallacy involves the use of authority in argument, or authoritative argument.

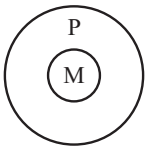
Ad ignorantiam fallacy involves assuming a proposition to be true, simply because it has not been proved false; or to be false, simply because it has not been proved true.

CHAPTER 24

Venn Diagram

All A, E, I and O type of propositions can also be represented in pictorial way and this method is known as Venn diagram.

(i) **Representation** of **"All M are P" (A type):**

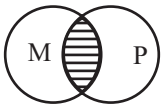


(ii) **Representation of "No M are P" (E type):**

(iii) **Representation of "Some M are P" (I type):**

This representation will be in two ways :

Either (a):

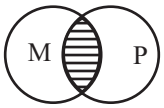


Or (b):

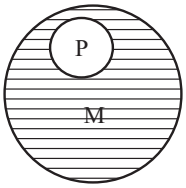
(iv) **Representation of "Some M are not P" (O type):**

This representation will be in three ways :

Either (a):



Or (b) :



Or (c):

How to solve?

Illustration

Statements :

A. All chairs are books.

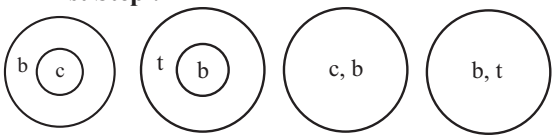
B. All books are ties.

Conclusions :

I. Some ties are books.

II. Some ties are chairs.

1st Step :



Here, 1A and 2A are representations for statement A while 1B and 2B are representations for statement B. In these representations

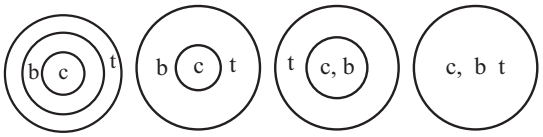
b = books

c = chairs

t = ties

2nd step :

Let us combine all the possible pairs of this pictorial representations :



3rd step :

When we interpret the pictures in step II, we find that all the pictures support both the conclusions. Therefore, conclusion I :

"Some ties are books" and

conclusion II.

"Some ties are chairs"

both are true.

Important Note : *In the Venn diagram method, any conclusion given with any problem will be true if and only if it is supported by all the combined pictorial representations through 2nd step. If any pictorial representation contradicts the given conclusion, it will be put in the category of incorrect or wrong conclusion.*

Now take another problem :

Illustration

Statements :

A. Some tigers are wolves.

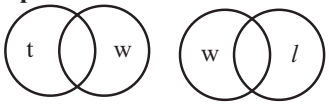
B. Some wolves are lions.

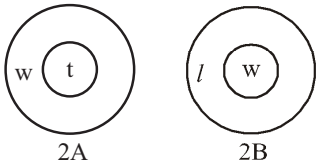
Conclusion :

I. Some tigers are lions.

II. Some tiger are not lions.

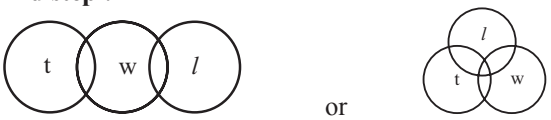
Sol. 1st step :



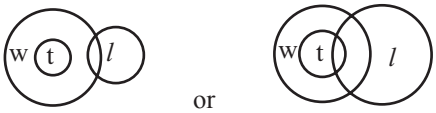


2A 2B

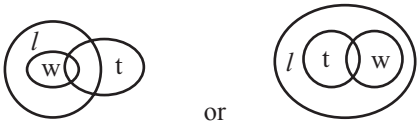
2nd step :



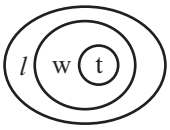
or
(1A + 1B)



or
(2A + 1B)



or
(1A + 2B)



(2A + 2B)

POSSIBILITY CASE:

When the term possibility arises in conclusion, we need to check:

- When "Some Relation" is given in statement and "All" is desired in the conclusion [POSSIBILITY=TRUE]
- When "No Relation" is given in statement and "All/Some" is desired in the conclusion [POSSIBILITY=TRUE]

In a statement these word are possibilities:

- Can be
- May be / might be
- is being a possibility
- Possible
- Chances
- Occurs
- is a possible

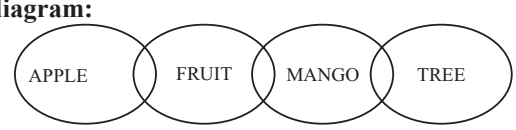
In a statement these word are sureties:

Can Never be
Can

Illustration

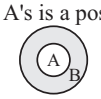
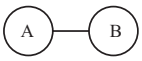
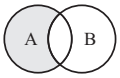
Statement: Some Apple is Fruit. Some Fruit is Mango. Some Mango is Tree

Venn diagram:



Conclusion:

(a) Some Apple being Mango is a possibility.
(b) Some Mango being Apple is a possibility.
(c) Some Apple being Tree is a possibility.
(d) Some Tree being Apple is a possibility.
(e) Some Fruit being Tree is a possibility.
(f) Some Tree being Fruit is a possibility.

Universal Affirmative	Particular Affirmative	Universal Negative	Particular Negative
Direct Statement: All A's are B's (1) Definite conclusion a) Some A's are B's b) Some B's are A's (i.e. These conclusions are sure conclusions without any doubt (2) Possible conclusions a) Some B's are not A's is a possibility  b) All B's are A is a possibility. i.e. 	Direct Statement: Some A's are B's 1) Definite conclusions a) Some B's are A's 2) Possible conclusion a) Some A's are not B is a possibility b) Some B's are not a is a possibility c) All A's are B's is a possibility d) All B's is A is a possibility	Direct Statement: All A's are not B's  1) Definite conclusions a) All B's are not A b) Some A's are not B c) Some B's are not A Note : Since there is no relation between A&B ∴ No possibility are definite conclusions	Direct Statement: Some A's are not B's  1) Definite conclusion none as nothing definite can be said from the diagram. All are a possibility 2) Possible conclusions a) Some A's are B's is a possibility b) Some B is A is a possibility c) Some B is not equal to A is a possibility d) All A is not equal to B is a possibility e) All B is not equal to A is a possibility f) All B is equal to A is a possibility Note: Vice–Versa is not a possibility i.e. All A is equal to B as the direct statements itself states that some A is not equal to B".

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REVERSE SYLLOGISM

Reverse syllogism is nothing but another version of syllogism in which conclusions are given and we have to find the appropriate statements which satisfies the conclusions.

Illustration

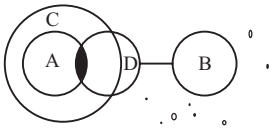
Conclusions:
I. All A can never be B
II. Any A which is a D is also C
Statements:
A. Some A is B. All B is C. Some C is D.
B. Some A are D. All A are C. No B is D.
C. No A is C. All C are B. Some C is D.
D. All A are C. Some C are D. No D is B.
E. None of these

Answer: Option B

Explanation:

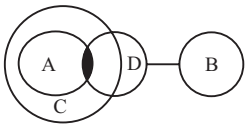
- First let us take a quick scan on the statements
- Take option A and compare it with conclusion I. **All A can never be B**. **Some A is B**. All B is C. Some C is D (option A is eliminated)
- Take option C and compare it with conclusion II. **Any** A which is a D is **also C. No A is C.** All C are B. Some C is D (option C is eliminated)
- Now we have option B and D.
- Take option B and compare with both the conclusions.

Some A are D. All A are C. No B is D



- From the shaded region it is clear that all A can never be B and any A which is D is also C. (Both conclusions follows, so option B is the answer.)
- In exam you can stop once you find the answer.
- But, now let us take option D also and check.

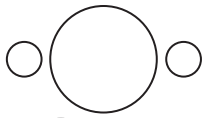
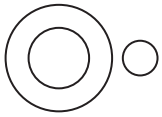
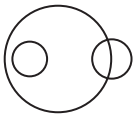
All A are C. Some C are D. No D is B.



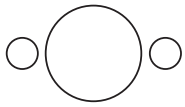
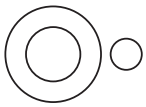
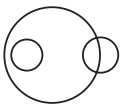
- Here all A can never be B may or may not be true
- Therefore, option D doesn't follow.

EXERCISE

1. The following question is based on the diagram given below. If the two small circles represent formal class-room education and distance education and the big circle stands for university system of education, which figure represents the university systems? **[June-2008]**

(a) 
(b)
(c) 
(d) 

2. If two small circles represent the class of the 'men' and the class of the 'plants' and the big circle represents 'mortality', which one of the following figures represent the proposition 'All men are mortal.' ? **[December-2010]**

(a) 
(b)
(c) 
(d) 

3. Venn diagram is a kind of diagram to **[December-2011 & June 2012]**
   (a) represent and assess the truth of elementary inferences with the help of Boolean Algebra of classes.
   (b) represent and assess the validity of elementary inferences with the help of Boolean Algebra of classes.
   (c) represent but not assess the validity of elementary inferences with the help of Boolean Algebra of classes.
   (d) assess but not represent the validity of elementary inferences with the help of Boolean Algebra of classes.

4. Which of the codes given below contains only the correct statements ? **[June-2013]**
   Statements :
   (i) Venn diagram is a clear method of notation.
   (ii) Venn diagram is the most direct method of testing the validity of categorical syllogisms.
   (iii) In Venn diagram method the premises and the conclusion of a categorical syllogism is diagrammed.
   (iv) In Venn diagram method the three overlapping circles are drawn for testing a categorical syllogism.
   Codes :
   (a) (i), (ii) & (iii) (b) (i), (ii) & (iv)
   (c) (ii), (iii) & (iv) (d) (i), (iii) & (iv)

5. Yadav, Arjun, Rajesh and Kamal play cricket. Rajesh and Kamal play tennis but do not play football. Yadav does not play Badminton but plays golf. Arjun does not play tennis. Kamal sometimes plays Badminton. Who does play only cricket ? **[September-2013]**
   (a) Yadav (b) Arjun
   (c) Rajesh (d) Kamal

6. Ananya and Krishna can speak and follow English. Bulbul can write and speak Hindi as Archana does. Archana talks with Ananya also in Bengali. Krishna can not follow Bengali. Bulbul talks with Ananya in Hindi. Who can speak and follow English, Hindi and Bengali ? **[December-2013]**

(a) Archana (b) Bulbul
(c) Ananya (d) Krishna

7. Namita and Samita are brilliant and studious. Anita and karabi are obedient and irregular. Babita and Namita are irregular but brilliant. Samita and Kabita are regular and obedient. Who among them is/are brilliant, obedient, regular and studious? **[December-2014]**

(a) Samita alone (b) Namita and Samita
(c) Kabita alone (d) Anita alone

8. Which of the codes given below contains only the correct statements? Select the code : **[June-2015]**

Statements:

(A) Venn diagram represents the arguments graphically.
(B) Venn diagram can enhance our understanding.
(C) Venn diagram may be called valid or invalid.
(D) Venn diagram is clear method of notation.

Codes :

(a) (A), (B) and (C) (b) (A), (B) and (D)
(c) (B), (C) and (D) (d) (A), (C) and (D)

9. Select the code which is not correct about Venn diagram: **[July-2016]**

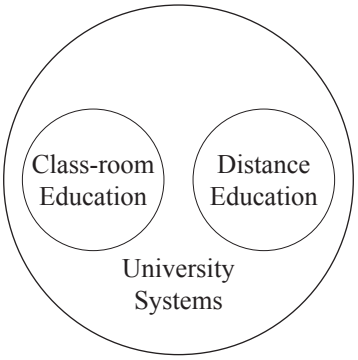
(a) Venn diagram represents propositions as well as classes.
(b) It can provide clear method of notation.
(c) It can be either valid or invalid.
(d) It can provide the direct method of testing the validity.

10. Which one of the following statements is not correct in the context of Venn diagram method? **[July-2018]**

(a) It is a method of testing the validity of arguments.
(b) It represents both the premises of a syllogism in one diagram.
(c) It requires two overlapping circles for the two premises of a standard-form categorical syllogism.
(d) It can be used to represent classes as well as propositions.

HINTS & EXPLANATION

1. (b)



2. (c)

3. (b) A Venn diagram (also called primary diagram, set diagram or logic diagram) is a diagram that shows all possible logical relations between a finite collection of different sets. These diagrams depict elements as points in the plane, and sets as regions inside closed curves.

4. (b) Correct statements are–

- Venn diagram is a clear method of notation.
- Venn diagram is the most direct method of testing the validity of categorical syllogisms.
- In Venn diagram method the three overlapping circles are drawn for testing a categorical syllogism.

5. (b)

Game / Person	Cricket	Tennis	Football	Golf	Badminton
Yadav	√	—	—	√	×
Arjun	√	×	—	—	—
Rajesh	√	√	×	—	—
Kamal	√	√	×	—	√

So Arjun plays only Cricket.

6. (c)

	Ananya	Krishna	Bulbul	Archana
Hindi	√		√	√
English	√	√	√	
Bangla	√		×	√

It is clear from table that Ananya can speak all thee languages.

7. (a)

8. (b)

9. (c) The Venn diagrams constitute an iconic representation of the standard form categorical propositions, in which spatial inclusions and exclusions correspond to the nonspatial inclusions and exclusions of classes. They provide an exceptionally clear method of notation. They also provide the basis for the simplest and most direct method of testing the validity of categorical syllogisms.

10. (c) A Venn diagram is a diagram that shows all possible logical relations between a finite collection of different sets. These diagrams depict elements as points in the plane, and sets as regions inside closed curves. It is a method of testing the validity of arguments.It represents both the premises of a syllogism in one diagram.It can be used to represent classes as well as propositions. Venn diagrams were conceived around 1880 by John Venn. They are used to teach elementary set theory, as well as illustrate simple set relationships in probability, logic, statistics, linguistics, and computer science.

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CHAPTER 25

Indian Logic : Means of Knowledge

There are nine prominent philosophical schools. Each of them has many sampradaya (sub-schools), and for every system there are authoritative texts and thinkers.

	Philosopher	System	Text
1.	Bachaspati	Carvakadarsana	Brahaspatyasutra
2.	Mahavira	Jainadarsana	Agama sahitya
3.	Siddhartha Gautama	Bauddhadarsana	Buddha Tripitaka
4.	Kapila	Sankhyadarsana	Sankhya–sutra
5.	Patanjali	Yogadarsana	Yoga-sutra
6.	Kanada	Vaisesikadarsana	Vaisesika-sutra
7.	Gautama	Nyayadarsana	Nyaya-sutra
8.	Jaimini	Mimansadarsana	Mimansa-sutra
9.	Badarayana	Vedantadarsana	Vedanta-sutra

There are many schools, they have different people. Therefore, there were different philosophical thoughts, of in several traditions. These are different systems, developed in different times. The people involved in these systems must have different frame of references on an idea or a concept or an event therefore, they have a different opinion and different understanding of a particular concept.

The Indian Philosophical System cam be broadly classified into two categories

1. Astika or Orthodox System: It follows the Vedas. People who believe in Veda are known as orthodox people. So, orthodox people in other words can also termed as Astika because they accept Veda. It has six schools.
   (a) Vaiseshika
   (b) Mimansha or Purva Mimansha
   (c) Vedanta or Uttara Mimansha
   (d) Samkhya
   (e) Yoga
   (f) Nyaya
2. Nastika or Heterodox System: It is non vedic system. Heterodox are those do not believe the existence of Veda. They said that Veda has a no meaning for us. Heterodox people are also known as Nastika because they do not accept Vedas as the scriptures. It has three schools
   (a) Jain
   (b) Buddha
   (c) Carvak or Materialistic Philosophy

Indian Philosophy, is the siddhi sopana, the ladder for freedom from suffering. All the Indian philosophical systems thus address the problem of dukha in its totality — the real nature of suffering, the real cause(s) of suffering, the state of complete absence of suffering and the means or method of achieving complete absence of suffering. Each philosophical system gives a considered answer to these questions. All systems agree, we have said above, that right knowledge is the supreme means of liberation, but they differ on the nature of this 'right knowledge': Mimansa believes that it consists in the proper performance of enjoined acts of duty.

In Vedanta, this knowledge consists in the awareness that all the visible, diverse, multiple forms and objects, both with and without 'life', are reflections of the same one being that permeates the entire universe.

Sankhya says that effort must be directed at achieving a discriminating intellect (vivekajñana) which enables us to grasp the true nature of reality as an interface of matter (prakrti) and energy (purusa).

Yoga says this knowledge consists in the ability to discipline and restrain the mind's potential to attach itself to objects of cognition. It teaches, instead, union (yoga) with the higher self; this may be achieved through knowledge of the self (jñana), devotion to a chosen deity (bhakti), or works free from egotism (karma), among other methods.

Nyaya says that a proper knowledge of the true nature of reality (tattvartha) enables one to decide what is to be acquired and grasped and what is to be rejected and renounced.

The Vaisesika system says that exact knowledge of the material reality (tattvajñana) frees one of the bonds of suffering.

The Jaina system talks of samyakadarsana, holistic and balanced knowledge that leads to cessation of action, karma.

The Buddhists attribute all sorrow to avidya, ignorance, and say that the knowledge of what is right action/conduct, acara, leads to freedom, nirvana.

Caraka was a thinker of medical science but what he says about illness or an ailing person applies to all human beings and all life — after all we all suffer unhappiness or sorrow at one time or the other and therefore we are all 'ailing' even if we are 'fit' medically. For all, Caraka says: In all ailments, the responsibility is of a physician, but in the mental ailment, it is the patients' own responsibility. A wise man keeping in mind his own welfare, acts with great care in respect of dharma, righteousness, artha, material acquisitions, and kama, desires. It is these three that are the cause of internal sukha or dukha. Such a patient should discipline himself and recognize the truth about himself, the maryada or limits of his family honour and conduct, the nature of time and place and social and economic strength.

Indian philosophy thus is put to use not to promote man's physical comfort or material success but to ensure his mental health, the well-being of his spirit (self), to help him realize his full intellectual potential and, finally, to enable him to free one's self of the binds of time, space and his physical body. This is the 'practical' dimension of Indian philosophy.

The period of development of Indian Philosophy can be divided in three periods

1. Vedic
2. Upnishad
3. Uttar Vedic (Post Vedic).

The systematic development happened in Uttar Vedic Period.

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EXERCISE

1. Which of the following statements is not correct in respect of pragmatism? **[June-2005]**
(a) Pragmatism does not accept a definite and eternal 'truth' or doctrine"
(b) According to "Pragmatism" truth is man- made
(c) Pragmatism is great supporter of spiritualism
(d) Pragmatism lays more stress on action than on thought

2. Devdatta is fat and he does not eat during the day. Therefore. Devadatta is eating during the night. The above example, in classical Indian School of Logic. is a case of : **[4th Dec. 2019-IInd Shift]**
(a) Comparison (b) Implication
(c) Perception (d) Verbal Testimony

3. Consider the following with reference to the Indian School of Logic **[6th Dec. 2019-IInd Shift]**
A. It is related to form of the argument only
B. It is related to the content of the argument only
C. It is related to perceptual knowledge alone
D. It is related to presenting analogies alone
Choose the correct answer from the options given below:
(a) A only (b) B only
(c) Both A and B (d) Both C and D

4. Match correctly the items of Column I with the items of Column II **[4th Dec. 2019-IInd Shift]**

Column I	Column II
(A) Ontology	(i) Ideographic
(B) Epistemology	(ii) Realism
(C) Methodolgy	(iii) Survey
(D) Method	(iv) Positivism

Choose the correct option from those given below :
(a) (A)-(ii), (B)-(iv), (C)-(iii), (D)-(i)
(b) (A)-(ii), (B)-(i), (C)-(iii), (D)-(iv)
(c) (A)-(iv), (B)-(ii), (C)-(i), (D)-(iii)
(d) (A)-(ii), (B)-(iv), (C)-(i), (D)-(iii)

5. Match the following values with their distinguishing functions: **[4th Dec. 2019-IInd Shift]**

List I action		List II Discipline
(A) Sacrifice	(i)	Working in a stipulated time
(B) Sincerity	(ii)	Confinement of individual mind on action
(C) Self control	(iii)	Showing love and affection
(D) Altruism	(iv)	Helping without selfish motives

Choose the correct option from those given below :
(a) (A)-(ii), (B)-(i), (C)-(iv), (D)-(iii)
(b) (A)-(iv), (B)-(i), (C)-(ii), (D)-(iii)
(c) (A)-(iii), (B)-(iv), (C)-(i), (D)-(ii)
(d) (A)-(i), (B)-(iii), (C)-(ii), (D)-(iv)

6. Which among the following is NOT the principle associated with Positivism? **[5th Dec. 2019-Ist Shift]**
(a) Phenomenalism (b) Deductivism
(c) Inductivism (d) Interpretivism

HINTS & EXPLANATION

1. **(c)** Pragmatism or experientialism holds that as the universe is dynamic and evolving, it is only what is experienced or observed that is real; and propounds that thought must produce action, rather than linger in the mind and lead to indecisiveness.

2. **(b)** This is an example of 'implication or assumption' or arthapatti Pramana (means of acquiring knowledge of the world), that is to gain knowledge through the implication of, or assumption based on, what is actually stated.

3. **(c)** Indian school of logic or nyaya is concerned with the form and content of reasoning and argument as recorded in the early texts of India.
Pratyaksha (perception) and upamana (analogy) are two of the six main sources of knowledge according to the Orthodox or Astika system of Indian philosophy. The other four are Anumana (Inference), Shabda (Verbal testimony), Arthapatti (Implication) and Anupalabddhi (Non-apprehension).

4. **(d)** **5.** **(b)**

6. **(d)** Positivism is a philosophical system recognizing only that which can be scientifically verified or which is capable of logical or mathematical proof, and therefore rejecting metaphysics and theism. Phenomenalism is at the heart of positivism as it accepts that physical objects can be known through their appearance as perceived phenomena. Positivist studies usually adopt deductive approach, though, sometimes may use inductive approach, too.
Interpretivism is not associated, rather contrasted, with Positivism. Positivists believe society shapes the individual , whereas intepretivists believe individuals shape society. The former use quantitative methods, while the latter, qualitative methods. Positivist research is value- free; and researcher is objective and independent of the data. Interpretivist research is value bound; and the researcher is subjective being part of the subject under research.

CHAPTER 26

Pramanas

The Orthodox System assumes six main sources of Pramana. Pratyaksha (Perception), Anumana (Inference), Upamana (Comparison), Shabda (Verbal testimony), Arthapatti (Implication) and Anupalabddhi (Non-apprehension).

Pramana literally means "proof" and "means of knowledge". It refers to epistemology in Indian philosophies. It is a theory of knowledge, and encompasses one or more reliable and valid means by which human beings gain accurate, true knowledge. The focus of Pramana is how correct knowledge can be acquired, how one knows, how one doesn't, and to what extent knowledge pertinent about someone or something can be acquired.

PRATYAKSH (PERCEPTION)

Pratyaksh or Perception is direct source of knowledge. It is what you see, what are things that exist in this world; then, you accept its validity and henceforth, you have a knowledge about that object. It enable a person to have correct cognitions of the world. Pratyaksha is of two kinds, direct perception (anubhava) and remembered perception (smriti). Some schools make a further distinction between indiscriminate perception (nirvikalpaka), in which the object is perceived without its distinguishing features, and discriminate perception (savikalpaka), in which the distinguishing features are both observed and recognized. Indiscriminate perception is important to the followers of the Advaita (Nondualist) school of Vedanta, for it allows for the liberating perception of brahman (ultimate reality), which is without features.

ANUMAN INFERENCE

Because, many things we cannot see; we have to infer the situation and your inference should be valid. And how it will be valid? It is called inferences or anumana. Gautama, the propounder of the Nyaya system defines anumana as a 'knowledge which is preceded by perception.' Vatsyayana defines inference as the knowledge of an object through the previous knowledge of some sign or mark. Dr. B. N. Seal defines inference as " Anumana (inference) is the process of ascertaining, not by perception or direct observation, but through the instrumentality or medium of a mark, that a thing possesses a certain character."

UPMANA

Many times we gain knowledge by comparing from one to another; that means, you compare from one object to another and hence you gain the knowledge about that object. The term upamana has been translated in various ways as comparison, analogy, identification, knowledge by similarity or knowledge by assimilation, etc. It is the knowledge derived from comparison and generally corresponds to analogy. Upamana has been admitted mostly by the realist philosophers. Their theory of pramana (including upamana) mostly follows Bhatta Mimamsaka. In Indian Philosophical tradition, there are three major realist schools. They are Nyaya, Vaisesika and Mimamsa. Of these three schools, the First and the third accept upamana as a distinct pramana while the Vaisesika realist does not admit upamana as a distinct source of valid cognition. Advaita also accepts it as a source of knowledge. According to the Nyaya, third kind of valid cognition is upamiti and its means is called upamana. Gautama defines comparsion as the knowledge of a thing through it's similarly to another thing previously well known. Vacaspati Misra states that upamana is a distinct means of knowledge since it produces a distinct type of cognition. Comparison is the relation between the names and the objects denoted by them. Sabara has defined the results (pramiti), in the case of upamana, he choose to define the means is always clearly distinguished from the result.

SHABDA OR VERBAL TESTIMONY

It is a valid source of knowledge; that means, you know who is a reliable person on which context. Therefore, you ask him or her opinion, on a particular issue; whatever he or she will say to you, you have to accept that, and you proceed accordingly. And whatever knowledge you gain from that, is known as verbal testimony. It is the knowledge of objects derived from words or sentences. According to Nyaya philosophy, testimony is a reliable statement. A sentence is a group of words and word is a distinct entity which has the power to express some meaning. According to the ancient Nyaya system, this power of being is due to God, while according to the Nyaya philosophers it is endowed by tradition. Sabda is also defined as the statement of an apta or a person who speaks and acts the way he thinks, a person whose mind, action and speech are in perfect harmony and is therefore accepted as an authority. It underlies the importance of Verbal testimony, providing authentic and authority of the relevant knowledge as the meaning of words and sentences (pada and vakya) which constitute verbal testimony. Vedanta Paribhasa states that a sentence is the unit of Sabda pramana which has been defined as a means of valid knowledge in which the relation among the meanings of its constituent word (which is the object of its intention) is not contradicted by any other means of knowledge. According to the Mimamsakas 'Sabda as pramana consists in the true knowledge of objects, derived from the understanding of the meaning of a sentence. According to Prabhakara non-Vedic Verbal cognition is of the nature of binference. Only the verbal cognition produced by the Vedas stands for Valid Verbal testimony but it is not in

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consistency with the theory of self validity of all cognitions. The Samkhya Karika defines verbal testimony as the statement (sruti) of the reliable (apta).

ARTHPATTI

The Advaita Vedanta and the Purva-Mimarhsa establish Arthapatti (Presumption or Postulation) to be a separate source of valid knowledge as different from Anumana (inference). According to the Naiyayikas, if we comprise Arthapatti within Anumana, it is rather rendered into Anumana from circumstances or disjunctive hypothetical syllogism. While the Advaita Vedanta and both the Bhatta and Prabhakara Mimarhsakas accept Arthipatti (presumption) as an independent source of valid knowledge and do not reduce to any other source ; the Naiyayikas, the Sarhkhyas, the Buddhists and the others object to this view of Arthapatti as a separate means of valid knowledge. The word 'arthapatti' goes under various translation as presumption, postulation, supposition, implication and assumption. It is a process of assuming some unknown fact in order to account for a well-known fact which is otherwise inexplicable. Knowledge thus obtained is distinctive, since it is not to be reduce to Pratyaksa(perception) or Anumana (inference), and it is not of course, a case of Agama (verbal authority) or Upamana (comparison). 'Arthapatti' derivatively means imagination of something in a different way. When something is otherwise unintelligible, the assumption of what will make it intelligible is designed 'Arthapatti'. As for instance, 'there is rain when there are clouds' is known from the fact that there is no rain when there are no clouds . One may object that this Arthapatti is invalid because when clouds are present there is no rain. It is not acceptable.The argument in the objection runs from the observation of the coherence of lack of rain with lack of clouds to the conclusion that clouds are necessary but not sufficient condition for rain. The Naiyayikas refuse to acknowledge Arthapatti as a separate pramana. According to the Naiyayikas, Arthapatti may be reduced to an Anumana (of the 'vyatireki' type).

ANUPALABDHI

In Vedanta Paribhasa, Dharmarajadhvarindra established the sixth way of valid knowledge which is accepted by the Advaita Vedantin as Anupalabdhi(non-apprehension) from the Vedantic stand point and as such very often deals with the refutation of other systems of philosophy like the Nyaya etc. In the Nyaya philosophy, Jayanta Bhatta refers only to the views of Bhattas, the Prabhakaras and Buddhists and comes to the conclusion that though Anupalabdhi or Abhava (Non-Apprehension or Negation) is a reality, Anupalabdhi is not a distinct way of knowing. The Advaita Vedantins accept Anupalabdhi as a distinct source of knowledge.

'In Indian Philosophy, Abhava (negation) has been discussed in two forms, viz., as an ontological reality and as a way of knowing. In the first form it is mentioned by such words as asat, alika, nirupakhya, nihsvabhava, etc., and in the second form it is referred to as Anupalabdhi. A general epistemological notion of the Bhatta Mimamsakas regarding negation is that there is some reality known as Abhava and there is a way ascertaing it which is known as Anupalabdhi. Here we are primarily concerned with the problem of Abhava as a means of knowledge'. The Advaita Vedantins and the Bhatta Mimarhsakas accept Anupalabdhi(Non-Apprehension) as an independent source of knowledge. They hold the view that the absence of an object or its attribute from a locus is known only through the means known as non-apprehension, i.e. 'anupalabdhi' but not by any other means of knowledge like Perception. The non-existence of a thing is apprehended by its non-perception. Non-apprehension of a thing is a means to the apprehension of its non-existence. In this context, the term non-apprehension stands for non-perception. Different theories of Anupalabdhi are found in oriental epistemology. Some systems deny Anupalabdhi as an additional pramana. There is a difference of opinion between the Naiyayika and the Vaisesika about the method of cognizing this pramana. The Naiyayikas maintain that Abhava is an object of perception (pratyaksa); on the other hand, in the opinion of the Vaisesikas it is cognized through inference(anumana). The Naiyayikas hold that non-existence of a pot on the ground is not identical with the bare ground.it is rather adjectival to it. Abhava is the character of the ground and it is perceived in the same ways in which the colour, size, etc., of the ground are perceived with the perception of the ground. To avoid these difficulties, the Naiyayikas have assumed special type of contact between the sence and Abhava which they call Visesana-visesya-bhava. The Naiyayikas who hold that Abhava is a reality but it can be cognized through perception and that there is no need of accepting Anupalabdhi as an additional pramana.

EXERCISE

1. Consider the example provided below:

"There is no jar now on the ground"

Identify the means of knowledge (Pramanna) involved in the example from the options given below:

[21st June 2019-IInd Shift]

(a) Anuplabdhi (b) Arthapatti
(c) Pratyaksha (d) Anumana

2. Consider the example given below:

Devadatta is growing fat.

He does not eat food during the day.

Therefore, He must be eating food during the night, other things being equal.

Identify the logic involved in the example provided above by choosing the correct answer from options given below:

[24th June 2019-IInd Shift]

(a) Arthapatti (b) Anupalabdi
(c) Anumana (d) Sabda

3. Consider the example provided below:

[26th June 2019-IInd Shift]

"This guava is like my cow"

This is an example of which means of knowledge (pramana)

(a) comparison (b) implication
(c) perception (d) inference

4. A perception where we do not have the knowledge of an object characterized by any predicate but an apprehension of some unrelated elements is called as?

[25th June 2019-Ist Shift]

(a) Determinate perception
(b) Indeterminate perception
(c) Verbal testimony
(d) Implication

5. The distinction between Savikalpaka (determinate) and Nirvikalpaka (indeterminate) is made with respect to which of the following pramanas'? **[2nd Dec. 2019-Ist Shift]**

(a) Anumana (inference)
(b) Pratyaksa (perception)
(c) Arthapatti (postulation)
(d) Upamana (comparison)

6. The distinction between laukika and alaukika is made with reference to which one of the following Pramanas?

[2nd Dec. 2019-IInd Shift]

(a) Anumana (Inference)
(b) Upamana (Comparison)
(c) Pratyaksa (Perception)
(d) S'abda (Verbal testimony)

7. Which of the following pramanas is used by classical Indian school of logic to prove the existence of God?

[3rd Dec. 2019-Ist Shift]

(a) Arthapatti (postulation)
(b) Upamana (comparison)
(c) Pratyaksa (perception)
(d) Anumana (inference)

8. The term 'Yogaja' (intuitive) pertains to which of the following pramanas? **[3rd Dec. 2019-Ist Shift)]**

(a) Perception
(b) Inference
(c) Verbal testimony
(d) Comparison

9. Assumption of an unperceived fact in order to reconcile two apparently inconsistent perceived facts is known in Indian Logic as: **[5th Dec. 2019-Ist Shift]**

(a) Anumana (Inference)
(b) Upamana (Comparison)
(c) Arthapatti (Implication)
(d) Anupalabdhi (Non-apprehension)

10. Which of the following is true with reference to anupalabdhi as a means of knowledge? **[6th Dec. 2019-Ist Shift]**

(a) I do not cognize the pot on the table, therefore it is absent there
(b) I directly perceive the absence of pot on the table
(c) I infer the absence of pot on the table since I do not no it to be there
(d) I know the absence of the pot on the table because I know its similarly with other

11. Which of the following is not a necessary step when you present an argument based on inference before the others according to the Classical Indian School of Logic?

[6th Dec. 2019-IInd Shift]

(a) Nigamana (b) Upamana
(c) Upanaya (d) Udaharana

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HINTS & EXPLANATION

1. (a) Anupalabdhi refers to the way in which something which is not present before the eyes is understood. Something that does not exist cannot be perceived through the senses; some other faculty of cognition is needed for it. This non-perceptive understanding of a non-existent object is called Anupalabdhi.

2. (a) The logic involved in the example is presumption. Indian philosophy postulates various means of gaining knowledge or proof (pramana).
Arthapatti is knowledge arrived at through presumption or postulation, derived from circumstances.
The others are Pratyaksha (perception)
Upamana (comparison and analogy)
Anupalabdi (non-perception, negative proof)
Abhava (non-existence)
Anumana (inference/deduction)
Sabda (word or testimony)

3. (a) We use 'like' or 'as' to compare one thing with another. In this example, 'guava' is being compared to 'cow'. So, 'This guava is like my cow' is an example of comparison.……

4. (b) Advaita of Hindu philosophy identifies two types of Direct Perception: determinate or savikalpaka and indeterminate or nirvikalpaka.
Determinate perception is that where the knowledge of an object gained from the statement has determinism associated with it as it is characterized by the predicate or directly relatable in terms of the substantive and its attributes.
Indeterminate perception is one where the knowledge gained from the statement is not directly relatable to the subject, i.e. the determinism 'I know this' is not discretely present. For example: 'This is that Shiva' has two components 'this is Shiva' and 'that was Shiva' where 'this' stands for what is present before us while 'that' refers to the past that has to be recalled from memory.

5. (b) In the Nyaya system, *nirvikalpa pratyaksha* is a term used by some authors to simply mean indeterminate or nebulous perception. As such, it refers to a state of cognition when one sees an object and doesn't quite grasp what it is. This is not granted the same validity as the *savikalpa pratyaksha* where an object presented to the senses is known fully.

6. (c) Perception is classified in the following two ways:
(i) Ordinary and Extra-ordinary perception (Laukika and Alaukika Pratyaksha)
(ii) Indeterminate and Determinate perception (Nirvikalpa and Savikalpa pratyaksha

7. (d) *Anumana* or inference Pramana is using observation, previous truths and reason to reach a new conclusion and truth; e.g., if one observes smoke, one can infer that there must be fire. Similarly, the existence of God was logically proved as an *anumana* or inference of the fruitlessness in the actions of men as the following line from Nyaya Sutra says:
īśvarah kāranam
purusakarmāphalyadarśanāt
which means, God is the cause; because we find fruitlessness in the actions of men.

8. (a) Perception or *Pratyaksha Pramana* can be *Laukika* (Ordinary) or *Alaukika* Pratyaksha (Extraordinary Perception).
The three types of alaukika are suggested as:
(i) Samanyalakshana Pratyaksha (Universal or General Character Perception)
(ii) Gyanalakshana Pratyaksha (Complicated Perception)
(iii) Yogaja Pratyaksha (Intuitive Perception)

9. (c) Indian logic identifies six pramanas or means of acquiring knowledge and truth: (i) pratyakṣa, i.e., perception; (ii) anumāna, i.e., inference; (iii) **upamāna**, i.e.,comparison and analogy; (iv) arthāpatti, i.e., postulation, implication, derivation from circumstances; (v) **anupalabdhi**, i.e., non-perception, negative cognitive proof; and, **Śabda**, i.e., word testimony. Thus, derivation/assumption/ implication on the basis of two apparently inconsistent perceived facts is Arthapatti.

10. (a) Anuplabdhi is the pramana (source of knowledge) of non-apprehension. its theorists held the view that the absence of an object or its attribute from a locus is known only through the means of non-apprehension, or 'anupalabdhi' rather than by any other means of knowledge like perception. The non-existence of a thing is apprehended by its non-perception. Non-apprehension of a thing is a means to the apprehension of its non-existence.

11. (b) Inference occupies a central place in the Hindu school of logic (Nyaya). This school worked out a syllogism in the form of an argument that goes through five stages: (1) the proposition (pratijna, literally "promise"), (2) the ground (hetu), (3) the illustration (udaharana), (4) the application (upanaya), and (5) the conclusion (nigamana). A syllogism is vitiated by a fallacious ground or hetvabhasa ("the mere appearance of a ground").
Upamana (analogy) is one of the six main sources of knowledge in astika system of Indian philosophy.

CHAPTER 27

The Structure of Inference (Anumana)

From the definitions of inference mentioned above, it appears that an inference must have some constituents. It has three terms and atleast three propositions. In the above mentioned example, three points are to be noted. First, there is the perception of a mark or reason (hetu), (e.g.smoke) in a subject(hill). Secondly, there is a recollection of the relation of invariable concomitance between smoke and fire as we have observed in the past. Thirdly, there is the inference of the existence of an unperceived object (e. g. fire) in the subject (e. g. hill). Three terms are involved in this inference.They are paka, sadhya and hetu. Paka is the subject in which the predicate or inferable object is doubted. The sadhya is that which we want to prove or establish in this inference. The hetu is the mark or sign which indicates the presence of the object which is to be inferred. Let us analyse the terms in the example mentioned above. Here in this example,hill is the paka, since paka is the subject in which the predicate is sought to be inferred. Smoke is the mark or sign which indicates the presence of the object which is to be inferred. Fire is the sadhya which is to be inferred in relation to the paka or the inferable. The paka, the sadhya and the hetu correspond to the minor term,major term and the middle term of the Aristotelian syllogism respectively. One point is to be added here the order of the propositions in a syllogism is written in the following way : the proposition which is sought to be established is to be written first,this is the conclusion of the inference; then the reason for the conclusion is to be written and then the affirmation of the recollection between the sadhya and the madhya is to be written. Here the first is the conclusion, the second is the minor premise and the third is the major premise.

We have seen that in inference we must have atleast three propositions, all of which are categorical and one must be affirmative and the others may be affirmative or negative. At this point we may observe that inference in Indian logic is a complex process which involves both induction and deduction. It includes both formal and material logic. But in western logic, a syllogism is formal. Moreover, a syllogism in western logic is generally stated in the form of three propositions, of which the first is the major premise, the second is the minor premise and the last is the conclusion.

In Nyaya theory of perception, we find five propositions. These propositions are known as 'members' (avayava) of Nyaya syllogism. These avayavas are: pratijña (proposition), hetu (reason), udaharana (example), upanaya (application) and nigamana (deduction). This five- member syllogism may be illustrated in the following way:

1) The hill is fiery (pratijña).

2) Because the hill is smoky(hetu).

3) Whatever is smoky is fiery, e.g. a kitchen(udaharana).

4) This hill is also smoky(upanaya).

5) Therefore this hill is fiery(nigamana).

The pratijña is the proposition which is sought to be established. The hetu is the second proposition which states the reason for this assertion. The third member is udaharana which states a universal relation between the hetu and the sadhya together with an example. The fourth is upanaya or the application of the universal concomitance to the present case. And the fifth is the nigamana or conclusion which is drawn from the preceding premises.

THE GROUNDS OF INFERENCE

Invariable concomitance or vyapti is the logical ground of inference. Udaharana or example which is the third proposition of the Nyaya system is regarded to be the logical ground of inference. Vyapti is the nerve of inference. Now the question is—what is vyapti? How is vyapti known by us?

Vyapti

Inference is the second source of valid knowledge according to nyaya philosophy. Anumana is the ground of inferential knowledge. According to naiyayikas, there are two grounds for an inferential knowledge. One is logical ground, another is psychological ground. A logical ground for inference is vyapti relation.

Vyapti relation is a universal concomitant and invariable relation between hetu or linga (middle term) and sadhya (major term) and in any kind of inference that can be found indispensably. Therefore, vyapti relation plays an important role in case of an inference. By the help of vyapti relation, we establish sadhya in pakshya. Sadhya is a major term and pakshya is a minor term.

Vyapti are of two types, one is samavyapti and another is asamavyapti.

Samavyapti

Samavyapti means two sided relation. That means by seeing a smoke, you can infer fire and by seeing a fire, you can also infer smoke. So, therefore, while inferring by seeing one to another, you can also inversely infer the situation, then that is called samavyapti.

In case of samavyapti, it is said that if you know that what is the effect, you know that where it comes from. That means, if you know the curd, you know that certainly it comes from milk and if you know that milk you know that after such and such condition it will transform to the curd. So, in both sides you can find the relation.

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In case of samavyapti, naiyayikas said that it is an equipollent concomitance relation between the two terms hetu and sadhya. That means these two terms hetu and sadhya, should be invariably related in such a manner that if one can see perceive one thing, immediately one can infer other things. For example, if one can see there is a smoke in one side, immediately one can infer fire and if one see the fire, one can immediately infer the smoke because they have a concomitance and invariable inseparable and universally related with each other, it means hetu can't exist without sadhya and vice-versa. So in samavyapti we may infer the cause from the effect and substance from the attribute and vice versa.

Asamavyapti

Asamavyapti is also known as Visamvyapti that means we can only infer from one to another side but inversely we cannot do so.

Asamavyapti means only one side we can infer it, not in reverse way. For example "all men are mortal", cannot say that all mortals are men because there are many animals, reptiles, insects also with mortality, they have the mortality. Naiyayikas explained here is that in this case, in case of asamavyapti we can argue only from one side. It is a relation of non-equipollent concomitance between the two terms. It is not a co-extensive because we may infer from one to another but not inversely. It corresponds to the western logic universal affirmative (A-type) propositions only because in case of universal affirmative proposition, only the subject part is distributed.

Vyapti relation can be explained both positively and negatively. For example, if I say this is my book. According to naiyayikas, they say that this book is not phone, this book is not pen, this book is not tree etc.

Hetu and sadhya is based on the four factors. One is anvaya, the second one is vyatireka, the third one is phuyodarsana and fourth one is tarka.

The **anvaya** is an affirmative inference. This is based on universal affirmative proposition (A). It is a permanent relation between this hetu and sadhya. We perceive these two things together always. In anvaya "all M is P". M here stands for as a middle term and P stands for the major term. In reference to the nyaya logicians, you find M is a middle term stands for hetu and P as a major term stands for sadhya.

Vyatireka contrasts to anvaya. This is based on universal negative proposition. This negatively establishes some fact. It contradicts to anvaya. The process of contradicting means the subject of the anvaya will be placed in the predicate of the vyatireka in a contradiction form and also the predicate of the anvaya contradicts and placed in the subject form of vyatireka. So, that in this case we will get "all not P is not M" because the P here the subject part which is neglected here in vyatireka.

Phuyodarsana implies the repeated observation of two terms together. We can infer only when in our past we have observed many of the situations positively.

Tarka, which stands for a hypothetical reasoning or hypothetical argument. Tarka or the hypothetical argument or hypothetical reasoning is needed for proving the validity of arguments. It helps or assists for removing the doubt of the argument of the fact.

Naiyayikas said that this tarka or the hypothetical argument helps for removing the doubts of the argument or the fact. Further they say wherever there is a doubt; it is arrested by tarka or hypothetical argument. If something is wrong in the conclusion, we may say that the argument may not be following proper logically or sequence. If there is no vyapti relation as such, then the fallacy will arise known as petitio principii.

HETAVABHASAS (FALLACIES)

In Indian logic a fallacy is known as hetvabhasa. This fallacy means, the middle term appears to be a reason but is not a valid reason. In Western logic fallacies are formal in nature. But the Naiyayikas hold that the logical forms of inference are the same for all valid inferences. A fallacy relates to material condition of an inference. So all fallacies are material fallacies. There are five characteristics of a valid term. When these characteristics are violated, fallacies arise. Five characteristics of a middle term are:

(1) It must be present in the minor term (pakadharmata); e.g., smoke must be present in the hill.

(2) It must be present in positive instances in which the major term is present,; e.g., smoke must be present in the kitchen where fire exists (sapakasattva).

(3) It must be absent in all negative instances in which the major term is absent; smoke must be absent in the lake in which fire does not exist (vipakasattva).

(4) It must be non-incompatible with the major term; e. g., it must not prove the coolness of fire (abadhita).

(5) It must be qualified by the absence of counteracting reasons which lead to a contradictory conclusion; e.g., 'the fact of being caused' should not be used to prove the 'eternality' of sound. (aviruddha). Violation of the above characteristics leads to the following fallacies. 1) Savyabhichara,2) Viruddha, 3) Satpratipaka, 4) Asiddha, and 5) Badhita.

(1) Savyabhichara or the fallacy of irregular middle: A middle term may be irregularly related to the major term. When the middle is not uniformly related to the major term then that is called savyabhicara hetu. Let us take the following example,

All bipeds are rational. Swans are bipeds.

Therefore, swans are rational.

Here, the middle term is 'biped'. But it is not uniformly related to the major term 'rational'. The middle term in this example may be related to both rational and non-rational creatures. Therefore, it is a defective hetu.

(2) Viruddha or the contradictory middle: The viruddha hetu or the contradictory middle is that hetu, which though offered to establish the existence of the sadhya actually establishes the non-existence of the sadhya; e.g. 'sound is eternal, because it is produced'- here, the middle term 'produced' does not prove the eternality of sound, but proves its non-eternality. Here, the middle term itself disproves the original proposition and proves its contradictory

(3) Satpratipaka or the inferentially contradicted middle: When a hetu which is advanced to establish a particular sadhya in an inference is validly contradicted by an another hetu which proves the non-existence of the sadhya of the first inference, the fallacy of satpratipaka arises. In this case the first hetu is called satpratipaka hetu. For example, 'sound is eternal, because it is audible' is validly contradicted by another inference 'sound is non-eternal, because it is produced like a pot.' Here, the middle term of the first inference, 'audible' is contradicted by the middle term of the second inference 'produced.'

(4) Asiddha or the unproved middle: The asiddha hetu is one which is not yet proved, but requires to be proved, like the sadhya. This means that the asiddha hetu is not a proved or an established fact, but an asiddha or unproved assumption. Let us take an example,'skylotus is fragrant, because it has lotusness in it like a natural lotus'. The middle term of the argument is yet to be proved, because we are yet to establish the existence of skylotus.

(5) Badhita hetu or the non-inferentially contradicted middle :The middle term of an inference may be contradicted by some other 'stronger'means of knowing, such as perception, testimony etc. It cannot prove the major term which is disproved by another stronger source of valid knowledge, e. g.,

'fire is cold, because it is a substance'. Here the middle term 'substance' becomes contradicted because its major term 'coldness' is directly contradicted by perception. These are the five kinds of defective hetus recognized in Indian logic.

Though a fallacy has no direct bearing upon inference as it is not a constitutive factor of it, it cannot he left aside as irrelevant. Fallacy is an impediment which must he avoided in order that the premises can lead to the expected conclusion. Fallacy has been defined to be a defect of the probans which being detected presents the deduction of the conclusion. Though the fallacy is not the condition of inference, the absence of it is so. It acts as a thwarting agent and if the probans be affected by it, the knowledge of the premises will be ineffective. It is therefore essential that an arguer should avoid the fallacies in order to make his argument successful and effective. It is therefore the negative condition of inference. The study of fallacies therefore is not useless inasmuch as it enables the arguer to achieve his objective. This is the positive service which is rendered by the knowledge of fallacies, which can be eliminated only if the arguer has knowledge of them in their general as well as their specific characters. The knowledge of fallacy also acts as a successful instrument for the exposure of the defects in the argument of the opponent. It thus brings to an end the debate by proving the opponent to be in the wrong and thereby rendering the syllogistic argument employed by him drop like a damp squib.

Fallacy arises when there Is a deficiency in the requisite character of anyone of the factors of inference which being discovered shows that either the major premises or the minor premises is wrongly formulated. The logicians of the Nyaya School regard contradiction.

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EXERCISE

1. Consider the argument provided below:

'Sound is impermanent because it is invisible'

Identify the fallacy involved in the above argument on the basis of Indian Logic. **[26th June 2019-IInd Shift]**

(a) Fallacy of irrelevant reason
(b) Fallacy of wrong assertion
(c) Fallacy of trivial reason
(d) Fallacy of contradictory reason

2. Consider the argument provided below:

"Sound is impermanent because it is audible"

Identify the fallacy involved in the above argument on the basis of Indian Logic from the options given below:

[25th June 2019-Ist Shift]

(a) Fallacy of Trivial reason
(b) Fallacy of irrelevant reason
(c) Fallacy of Wrong assertion
(d) Fallacy of contradictory reason

3. Inference (anumana) in Indian Logic is rooted in:

[20th June 2019-Ist Shift]

(a) variable relation between minor term and major term.
(b) invariable relation between middle term and minor term.
(c) variable concomitance between middle term and major term.
(d) invariable concomitance between middle term and major term.

4. Consider the argument given below:

"Sound is permanent because it is audible"

Identify the fallacy involved in the above argument on the basis of Indian logic from the options given below:

[21st June 2019-IInd Shift]

(a) Fallacy of trivial reason
(b) Fallacy of irrelevant reason
(c) Fallacy of contradictory reason
(d) Fallacy of wrong assertion

5. Which one of the following is signified by the term 'hetu' in the process of anumana (inference) in classical Indian School of Logic? **[5th Dec. 2019-Ist Shift]**

(a) Example provided
(b) Statement of reason
(c) Proposition to be proved
(d) Conclusion proved

6. Which one of the following hetvabhasa (fallacy) is involved in the argument. "Sound is element because it is caused"?

[4th Dec. 2019-Ist Shift]

(a) Viruddha or contradictory middle
(b) Satpratipaksa or inferentially contradicted middle
(c) Sadhyasama or the unproved middle
(d) Badhita or non-inferentially contradicted middle

7. Which one of the following fallacious hetu (middle term) is not uniformly concomitant with the major term?

[4th **Dec. 2019-Ist Shift]**

(a) Asatpratipaksa
(b) Auyatireki
(c) Anyonya-Asiddha
(d) Savyabhicara

8. According to classical Indian school of logic, what is the correct sequence of steps involved in Anumana (influence)?

[4th Dec. 2019-Ist Shift]

(a) Upanaya, Pratijna, Hetu, Udaharana , Nigmana
(b) Pratijna, Hetu, Upanaya, Udaharana, Nigmana
(c) Pratijna, Upanaya, Hetu, Udaharana, Nigmana
(d) Pratijna, Hetu, Udaharana, Upanaya, Nigmana

9. The term 'Paksa according to classical Indian school of logic refers to which of the following terms in the process of inference? **[2nd Dec. 2019-Ist Shift]**

(a) Major term
(b) Undefined term
(c) Minor term
(d) Middle term

10. Which of the following is not correct with reference to **anumana** according to classical Indian school of logic?

[3rd Dec. 2019-IInd Shift]

(a) Linga/Sadhana is the middle term
(b) Paksa is the minor term
(c) Sadhya is the major term
(d) Hetu is the minor term

11. Which one of the following is signified by Udaharana of Anumana (Inference) in Indian Logic?

[4th Dec. 2019-IInd Shift]

(a) Statement of reason
(b) Proposition to be proved
(c) Conclusion proved
(d) Universal proposition along with an stance

12. Consider the example of *anumana* given below:

[5th Dec. 2019-IInd Shift]

(A) The mountain is fiery
(B) Because it has smoke
(C) Wherever there is smoke, there is fire.

Which one of the following expresses Vyapti (relation of invariable concomitance)?

(a) The relation of invariable concomitance between mountain and fire.
(b) The relation of invariable concomitance between mountain and smoke.
(c) The relation of invariable concomitance between fire and smoke.
(d) The relation of invariable concomitance between perceiver and the smoke.

13. "Fire is cold, because it is a substance" - is an instance of which one of the hetvabhas (fallacy of inference)

[5th Dec. 2019-IInd Shift]

(a) Asiddha (unproved middle term)
(b) Badhita (non-inferential contradicted middle)
(c) Virudha (contradictory middle)
(d) Savyabhicasa (irregular middle)

HINTS & EXPLANATION

1. (a) The fallacy of the irrelevant reason is a type of inference where a reason is given in support of a conclusion but this reason is irrelevant to the truth or falsity of the conclusion. In this argument, 'invisibility' is irrelevant reason for the conclusion of sound being 'impermanent'. Air is invisible, yet permanent.…….

2. (a) Though 'sound is audible' is true, it is a rather insignificant or trivial reason to support the statement 'Sound is permanent'.

Fallacy of trivial reason: a reason given in support of a conclusion being very insignificant in establishing the truth or falsity of the conclusion.

Fallacy of the irrelevant reason: a reason given in support of a conclusion being irrelevant to the truth or falsity of the conclusion.

Fallacy of contradictory reason: a reason given in support of a conclusion being contradictory to the truth or falsity of the conclusion.

Fallacy of wrong assertion: a reason repeatedly asserted as true despite being faulty.

3. (d) Vyapti or invariable concomitance between the middle term and the major term is the logical ground of inference.

4. (a) Though 'sound is audible' is true, it is a rather insignificant or trivial reason to support the statement 'Sound is permanent'.

Fallacy of trivial reason: a reason given in support of a conclusion being very insignificant in establishing the truth or falsity of the conclusion.

Fallacy of the irrelevant reason: a reason given in support of a conclusion being irrelevant to the truth or falsity of the conclusion.

Fallacy of contradictory reason: a reason given in support of a conclusion being contradictory to the truth or falsity of the conclusion.

Fallacy of wrong assertion: a reason repeatedly asserted as true despite being faulty.

5. (b) Anumana or inference in the Indian school of logic or Nyaya philosophy prescribes five stages of argument:

(1) the proposition (pratijna); (2) the ground or reason (hetu); (3) the illustration/example (udaharana); (4) the application (upanaya); and, (5) the conclusion (nigamana). This can be impaired by hetvabhasa or fallacy (unsound/ invalid/ faulty reasoning).

6. (a) In Viruddha hetvabhasa or contradictory fallacious reason, the middle term abides in the minor term as well as in its opposite. It is a reason uniformly concomitant with a contrary inference as well, which means, it proves the contrary of what it is intended to prove. e.g. In "Air is heavy because it is empty", the middle term 'empty' actually disproves the heaviness of air. Similarly, in 'Sound is element, because it is caused', the middle term, 'caused' actually disproves that sound is element because element is a naturally occurring thing rather than 'caused'.

7. (d) Savyabhicāra literally means 'irregular middle'.

According to the Nyāya system of religious philosophy, savyabhicāra hetvābhāsa occurs when a syllogism has an irregular middle term, which makes the inference incorrect, as illustrated below:

- All cars are trucks.
- Buses are cars.
- Hence, buses are trucks.

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Since the middle term 'cars' is not uniformly related to the major term 'trucks', the conclusion is inferred to be incorrect.

8. (d) According to classical Indian school of logic, *Anumana* or Inference is the second of the *pramana*s, or the five means of knowledge. It occupies a central place in the Hindu school of logic (Nyaya). This school worked out a syllogism in the form of an argument that goes through five stages: (1) the proposition (*pratijna)*, (2) the ground (*hetu*), (3) the illustration (*udaharana*), (4) the application (*upanaya*), and (5) the conclusion (*nigamana*).

9. (c) Like the Aristotelian syllogism, the Indian inference has three terms. The major, the minor and the middle are here called sadhya, paksa and linga or hetu respectively.

10. (d) Anumana or inference in Classical Indian School of Logic has three terms: the major, the minor and the middle are here called sadhya, paksa and linga or hetu, respectively.

11. (d) *Anumana* is 'inference' drawn from the information perceivable by the senses. It is stated in categorical propositions which are 'universal' or 'particular'. *Udaharana* is 'example or instance' presented for greater understanding, once the inference is drawn.

12. (c) Vyapti implies a correlation between two facts, of which one is, pervaded (Vyapya) and the other pervades (Vyapya). In anumana (inference), the major term (Sadhya) is related to minor term (Paksa) and its relation depends upon the universal relation between the major term and the middle term (Hetu). So it is on the ground of Vyapti that the middle term leads to the knowledge of inferred object.

13. (b) In Anumana (inference), fallacies (hetvābhasa) may occur due to the following:

(i) Asiddha: when hetu (ground) is unproved).

(ii) Savyabhicara: When *hetu* is irregular.

(iii) Satpratipaksa: Here the hetu is contradicted by another hetu. If both have equal force, then nothing follows. 'Sound is eternal, because it is audible', and 'Sound is non-eternal, because it is produced'. Here 'audible' is counterbalanced by 'produced' and both are of equal force.

(iv) Badhita: When another proof (as by perception) definitely contradicts and disproves the middle term (hetu). 'Fire is cold because it is a substance'.

(v) Viruddha: Instead of proving something it is proving the opposite. 'Sound is eternal because it is produced'.

CHAPTER 28

Sources, Acquisition and Classification of Data

Data can be numbers, images, words, figures, facts or ideas. Data in itself cannot be understood and to get information from the data one must interpret it into meaningful information. There are various methods of interpreting data.

Data sources are broadly classified into primary and secondary data.

Data collection plays a very crucial role in the statistical analysis. In research, there are different methods used to gather information, all of which fall into two categories, i.e. primary and secondary data

As the name suggests, Primary data is one which is collected for the first time by the researcher while secondary data is the data already collected or produced by others.

DATA ACQUISITION

Data is one of the most important and vital aspect of any research studies. Researchers conducted in different fields of study can be different in methodology but every research is based on data which is analyzed and interpreted to get information. Data is the basic unit in statistical studies. Statistical information like census, population variables, health statistics, and road accidents records are all developed from data.

There are two sources of data collection techniques. Primary and Secondary data collection techniques, Primary data collection uses surveys, experiments or direct observations.

Secondary data collection may be conducted by collecting information from a diverse source of documents or electronically stored information, census and market studies are examples of a common sources of secondary data. This is also referred to as "data mining"

CLASSIFICATION OF DATA

Data classification is the process of organizing data into categories for its most effective and efficient use.

Classification is the way of arranging the data in different classes in order to give a definite form and a coherent structure to the data collected, facilitating their use in the most systematic and effective manner. It is the process of grouping the statistical data under various understandable homogeneous groups for the purpose of convenient interpretation.

There are three different approaches are the industry standard for data classification:

- Content – based classification
- Context-based classification
- User –based classification

EXERCISE

1. The function of measurement includes: **[December-2007]**
(a) Prognosis
(b) Diagnosis
(c) Prediction
(d) All of these

2. Probability sampling implies: **[December-2007]**
(a) Stratified Random Sampling
(b) Systematic Random Sampling
(c) Simple Random Sampling
(d) All of the above

3. If the population growth follows a logistic curve, the maximum sustainable yield: **[June-2008]**
(a) is equal to half the carrying capacity.
(b) is equal to the carrying capacity.
(c) depends on growth rates.
(d) depends on the initial population.

4. In a large random data set following normal distribution, the ratio (%) of number of data points which are in the range of (mean ± standard deviation) to the total number of data points, is **[June-2010]**
(a) ~ 50% (b) ~ 67%
(c) ~ 97% (d) ~ 47%

5. Among the following, identify the continuous type of data : **[January-2017]**
(a) Number of languages a person speaks
(b) Number of children in a household
(c) Population of cities
(d) Weight of students in a class

6. Nine year olds are taller than seven year olds. This is an example of a reference drawn from **[June-2012]**
(a) Vertical study (b) Cross-sectional study
(c) Time series study (d) Experimental study

7. Which of the following statistical technique will be appropriate for data analysis when the observations are available in the form of frequencies? **[6th Dec. 2019-Ist Shift]**
(a) Parametric 't' test
(b) Non-parametric 'u' test
(c) Non-parametric 'chi-square' test
(d) Parametric correlated 't' test

8. If data has been recorded using technical media, which among the following is a necessary step on the way to its interpretation? **[6th Dec. 2019-IInd Shift]**
(a) Transcription
(b) Structural Equation Modelling
(c) Sequential Analysis
(d) Sampling

HINTS & EXPLANATION

1. (d) The function of mesurement includes prognosis, diagnosis and prediction

2. (d) Probability Sampling implies random selection from a larger population so that everyone has the probability or chance of being chosen. The types of probability sampling are Simple Random sampling, Stratified Random Sampling, Systematic Sampling, Cluster Random Sampling and Multi-Stage Random sampling

3. (a) The generalized (generalized) logistic function or curve, also known as Richards' curve, originally developed for growth modelling is an extension of the logistic or sigmoid functions, allowing for more flexible S-shaped curves. It is equal to the half the carrying capacity.

4. (b) For a normal distribution:
There are ~ 67% of the observations which are within the range of (mean ± standard deviation) to the total number of date points.

5. (d) Continuous data : The data which can take any value between two whole numbers are called continuous data. For example,
Weight of students of a class : 42.25 kg, 46.30 kg, 47.25 kg, 55 kg
Height of students : 145 cm, 146.50 cm, 147.25 cm, 155.49 cm
Measurement of rainfall on different days: 30 mm, 32 mm, 35.23 mm, 34.50 mm
Temperature on different days : 25ºC, 23.5ºC, 32.4.C, 28.7ºC.

6. (b) Cross-sectional research involves using 'cohorts' of different groups of people who differ in one key characteristic (the variable of research interest) at one specific point in time but share other characteristics, such as socioeconomic status, educational background, and ethnicity. For example, researchers might create cohorts of participants who differ in age (say, are in their 30s, 40s, and 50s). The given question refers to cohorts of seven and nine year olds.

7. (c) Non-parametric chi-square test will be the most appropriate in this case.
There are two types of statistical inference methods: parametric and nonparametric.
In Parametric method one defines the probability distribution of probability variables and makes inferences about the parameters of the distribution.
In cases in which the probability distribution cannot be defined, nonparametric methods are employed. Nonparametric tests are less powerful than parametric tests, so we don't use them when parametric tests are appropriate. But if the assumptions of parametric tests are violated, we use nonparametric tests. Nonparametric tests are classified according to the variables' level of measurement and the sample size.
The chi-square test is used mainly when dealing with a nominal/categorical variable. The levels of the variable are discrete, mutually exclusive categories, and the data consist of frequencies or counts for each category.
T tests are a type of parametric method; they are used to compare the means of two groups when the samples satisfy the conditions of normality, equal variance, and independence.
T tests can be of two types: (i) The independent t-test, which is used when the two groups under comparison are independent of each other; and (ii) the paired/ correlated t-test, which is used when the two groups under comparison are dependent on each other.
Mann Whitney U test is a popular nonparametric test to compare outcomes between two independent. It is used to test whether two samples are likely to derive from the same population (i.e., that the two populations have the same shape).

8. (a) Interpreting or analysing the collected data is essential to make inferences and arrive at conclusions. However, data should be in comprehensible form to be useful for the purpose. Qualitative data is generally descriptive and needs to be coded for ease of analysis. Qualitative data collected through technical media such as audio and/or video recording first needs to be transcribed (put thoughts, speech, or data into written or printed form), only then can it be coded.
Data transcription refers to the process by which certain qualitative data is interpreted or translated into words that can then be categorised, coded and studied.
Structural equation modeling is a multivariate statistical analysis technique that is used to analyze the structural relationship between measured variables and latent constructs.
Sequential analysis or sequential hypothesis testing is statistical analysis where the sample size is not fixed in advance. Instead data are evaluated as they are collected, and further sampling is stopped in accordance with a pre-defined stopping rule as soon as significant results are observed.
Sampling is the process of selecting units (e.g., people, organizations) from a population of interest so that by studying the sample the researcher may fairly generalize the findings to the population from which they were chosen.

CHAPTER 29

Quantitative and Qualitative Data

- Quantitative data are anything that can be expressed as a number, or quantified. Examples of quantitative data are scores on achievement tests, the number of hours of study, or weight of a subject. These data may be represented by ordinal. Interval or ratio scales and lend themselves to most Statistical manipulation.
- Qualitative data cannot be expressed as a number. Data that represent nominal scales such as gender, social economic status, religious preference are usually considered to be qualitative data.

EXERCISE

Directions (Qs. 1-5) : The following table presents the production of electronic items (TVs and LCDs) in a factory during the period from 2006 to 2010. Study the table carefully and answer the questions. **[December-2010]**

Year	2006	2007	2008	2009	2010
TVs	6000	9000	13000	11000	8000
LCDs	7000	9400	9000	10000	12000

1. In which year, the total production of electronic items is maximum ? **[December-2010]**
(a) 2006 (b) 2007
(c) 2008 (d) 2010

2. What is the difference between averages of production of LCDs and TVs from 2006 to 2008 ? **[December-2010]**
(a) 1000 (b) 867
(c) 1015 (d) 400

3. What is the year in which production of TVs is half the production of LCDs in the year 2010 ? **[December-2010]**
(a) 2007 (b) 2006
(c) 2009 (d) 2008

4. What is the ratio of production of LCDs in the years 2008 and 2010 ? **[December-2010]**
(a) 4 : 3 (b) 3 : 4
(c) 1 : 3 (d) 2 : 3

5. What is the ratio of production of TVs in the years 2006 and 2007 ? **[December-2010]**
(a) 6 : 7 (b) 7 : 6
(c) 2 : 3 (d) 3 : 2

Directions (Qs. 6-8): are based on the following data :
Measurements of some variable X were made at an interval of 1 minute from 10 A.M. to 10:20 A.M. The data, thus, obtained is as follows :
X : 60, 62, 65, 64, 63, 61, 66, 65, 70, 68
63, 62, 64, 69, 65, 64, 66, 67, 66, 64

6. The value of X, which is exceeded 10% of the time in the duration of measurement, is **[June-2011]**
(a) 69 (b) 68
(c) 67 (d) 66

7. The value of X, which is exceeded 90% of the time in the duration of measurement, is **[June-2011]**
(a) 63 (b) 62
(c) 61 (d) 60

8. The value of X, which is exceeded 50% of the time in the duration of measurement, is **[June-2011]**
(a) 66 (b) 65
(c) 64 (d) 63

9. The sum of deviation taken from which of the descriptive statistical measure is always equal to zero? **[21st June 2019-Ist Shift]**
(a) Mean (b) Median
(c) Mode (d) Percentile

10. Match the two sets given below in which Set I mention levels of measurement and Set II their properties :

[2nd Dec. 2019-IInd Shift]

Set I	**Set II**
(Levels of measurement)	**(Properties)**
(A) Nominal	(i) Classification, order, equal units and Absolute zero
(B) Ordinal	(ii) Classification. order and equal units
(C) Interval	(iii) Classification
(D) Ratio	(iv) Classification and order

Select correct answer from the options given below:

(a) (A)-(i), (B)-(ii), (C)-(iii), (D)-(iv) (b) (A)-(ii), (B)-(iii), (C)-(iv), (D)-(i)

(c) (A)-(iii), (B)-(i), (C)-(ii), (D)-(iv) (d) (A)-(iii), (B)-(iv), (C)-(ii), (D)-(i)

HINTS & EXPLANATION

1. (c) Total production of electronic items = TVS + LCDs

For 2006, 6000 + 7000 = 13000

For 2007, 9000 + 9400 = 18400

For 2008, 13000 + 9000 = 22000

For 2010, 8000 + 12000 = 20000

In 2008, the total production of electronic items is maximum.

2. (b) Average of LCDs from 2006 to 2008

$$= \frac{7000 + 9400 + 9000}{3} = \frac{25400}{3} = 8466.66$$

Average of TVs from 2006 to 2008

$$= \frac{6000 + 9000 + 13000}{3} = 9333.33$$

Difference = 9333.33 – 8466.66 ≅ 867

3. (b) Production of LCD in year 2010 = 12000

than $\frac{1}{2} \times 12000 = 6000$

Production of TV is 6000 in 2006.

4. (b) $\frac{\text{LCD (2008)}}{\text{LCD (2010)}} = \frac{9000}{12000} = \frac{3}{4}$

5. (c) $\frac{\text{TV (2006)}}{\text{TV (2007)}} = \frac{6000}{9000} = \frac{2}{3}$

Sol. (6-8):

Arrange the data decreasing order :

X : 70, 69, 68, 67, 66, 66, 66, 65, 65, 65,
64, 64, 64, 64, 63, 63, 62, 62, 61, 60

6. (b) 10% of the measurement is first two measurement = 70 and 69.

So, data exceeded 10% of the time = 68

7. (c) 90% of the measurement is 18 variables.

So, data exceeded 90% of the time = 61

8. (c) 50% of the measurement is 10 variables.

So, data exceeded 50% of the time = 64

9. (a) The sum of the deviations from the mean is zero. This will always be the case as it is a property of the sample mean i.e. the sum of the deviation below the mean will always equal to the sum of the deviation above the mean.

10. (d)

(a)	Nominal	(iii)	Classification by assigning symbols
(b)	Ordinal	(iv)	Classification and ranking in order
(c)	Interval	(ii)	Classification and ordering of equal units/intervals
(d)	Ratio	(i)	Classification and ordering of equal units with absolute zero achievable

CHAPTER 30

Graphical Representation

The act of organising and interpreting data to get meaningful information is data interpretation. It majorly deals with the comparison of numbers and is not formula-based. In data interpretation, culling out the requisite data is the first step.

Data interpretation is one of the easiest sections of NET paper-I. It is basically about drawing conclusions and inferences or graphical form by means of an illustration namely table, line graphs, pie charts, bar graph and so on. In UGC exam, questions asked in this section are based on table.

These questions test the candidates ability to interpret the information presented and to select the appropriate data for answering a question.

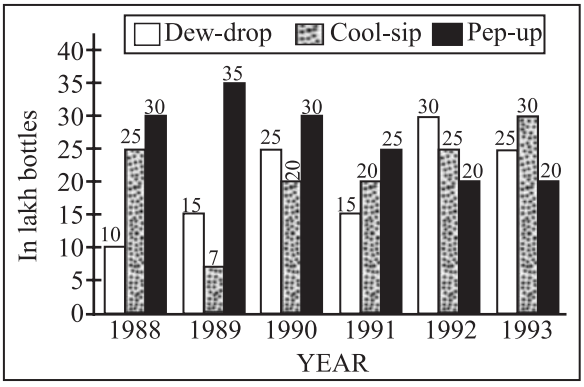
The numerical data pertaining to any situation can be presented in the form of:

1. **Numerical data table:** It is easiest way of presenting data but it does not show trends effectively.
2. **Line graph:** It is easy to spot trends in the given data, though it is difficult to read actual values.
3. **Bar graph:** In this type, data is shown in blocks and direct comparison of actual values is very easy.
4. **Pie charts:** In this type, data is expressed as percentage.
5. **Caselet form:** It is most difficult and row form of data interpretation.

EXERCISE

DIRECTIONS (Qs. 1–3) : Study the following graph and answer the question.

[December-2004]



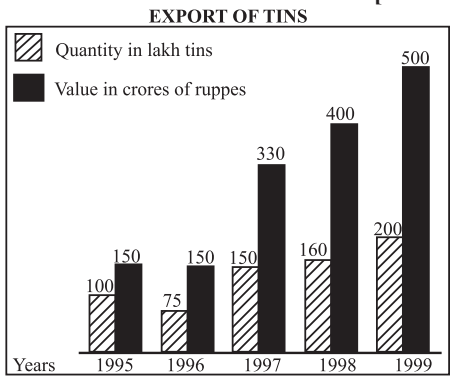
1. In which year was the sale of 'Pep - up' the maximum?
(a) 1990 (b) 1992
(c) 1993 (d) None of the above

2. In the case of which soft drink was the average annual sale maximum during the period 1988 - 1993.
(a) Pep - up only (b) Cool - sip only
(c) Cool - sip and Dew - drop (d) Pep - up and Dew - drop

3. What was the approximate percent drop in the sale of Pep - up in 1990 over its sale in 1989 ?
(a) 5 (b) 12
(c) 14 (d) 20

DIRECTIONS (Qs. 4–8) : Study the following graph carefully and answer the questions.

[December-2005]



4. In which year the value per tin was minimum?
(a) 1995 (b) 1996 (c) 1998 (d) 1999

5. What was the difference between the tins exported in 1997 and 1998?
(a) 10 (b) 1000 (c) 100000 (d) 1000000

6. What was the approximate percentage increase in export value from 1995 to 1999 ?
(a) 350 (b) 330.3
(c) 433.3 (d) None of these

7. What was the percentage drop in export quantity from 1995 to 1996 ?
(a) 75 (b) 50 (c) 25 (d) None of these

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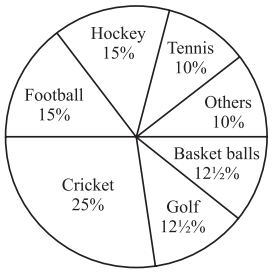
8. If in 1998, the tins were exported at the same rate per tin as that in 1997, what would be the value (in crores of rupees) of export in 1998 ?
(a) 400 (b) 375 (c) 352 (d) 330

DIRECTIONS (Qs. 9–13) : The following pie chart indicates the expenditure of a country on various sports during a particular year. Study the pie chart and answer it.

[June-2006]



9. The ratio of the total expenditure on football to that of expenditure on hockey is:
(a) 1 : 15 (b) 1 : 1 (c) 15 : 1 (d) 3 : 20

10. if the total expenditure on sports during the year was ₹ 1,20,000,00 how much was spent on basket ball?
(a) ₹ 9,50,000 (b) ₹ 10,00,000
(c) ₹ 12,00,000 (d) ₹ 15,00,000

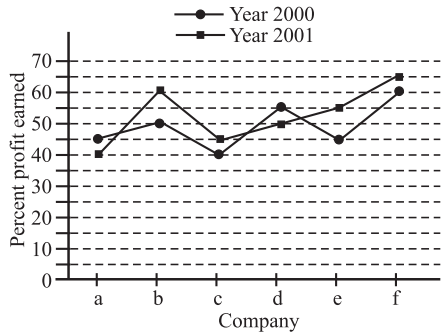
11. The chart shows that the most popular game of the country is :
(a) Hockey (b) Football (c) Cricket (d) Tennis

12. Out of the following country's expenditure is the same on:
(a) Hockey and Tennis (b) Golf and Basket ball
(c) Cricket and Football (d) Hockey and Golf

13. If the total expenditure on sport during the year was ₹ 1,50,00,000 the expenditure on cricket and hockey together was:
(a) ₹ 60,00,000 (b) ₹ 50,00,000
(c) ₹ 37,50,000 (d) ₹ 25,00,000

DIRECTIONS (Qs. 14–16) : Study the following graph and answer the question numbers.

[December-2006]



14. In the year 2000, which of the following Companies earned maximum percent profit?
(a) a (b) b (c) d (d) f

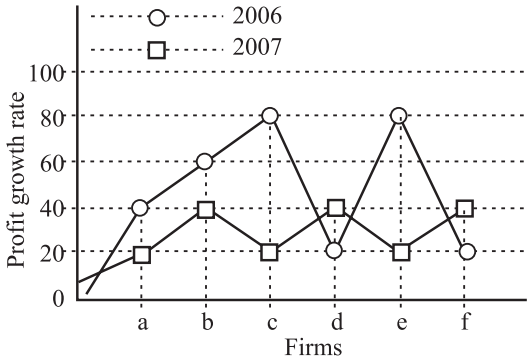
15. In the year 2001, which of the following Companies earned minimum percent profit?
(a) a (b) c (c) d (d) e

16. In the years 2000 and 2001, which of the following Companies earned maximum average percent profit?
(a) f (b) e (c) d (d) b

17. Circle graphs are used to show: **[June-2007]**
(a) How various sections share in the whole?
(b) How various parts are related to the whole?
(c) How one whole is related to other wholes
(d) How one part is related to other parts?

DIRECTIONS (Qs. 18-19): Study the following graph and answer the questions.

[December-2008]



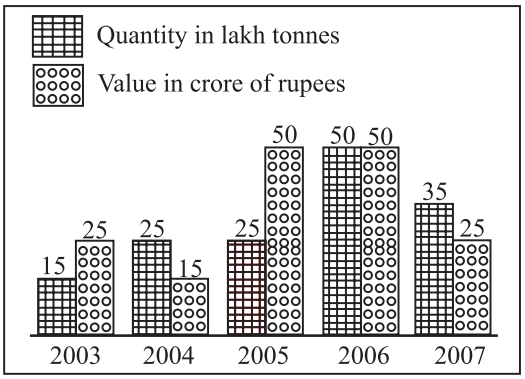
18. Which of the firms got maximum profit growth rate in the year 2006?
(a) ab (b) ce (c) cd (d) ef

19. Which of the firms got maximum profit growth rate in the year 2007?
(a) bdf (b) acf (c) bed (d) ace

DIRECTIONS (Qs. 20-22): Study the following graph carefully and answer the questions.

[June-2009]

Export of Engineering Goods



20. In which year the quantity of engineering goods' exports was maximum?
(a) 2005 (b) 2006 (c) 2004 (d) 2007

21. In which year the value of engineering goods decreased by 50 percent compared to the previous year?
(a) 2004 (b) 2007 (c) 2005 (d) 2006

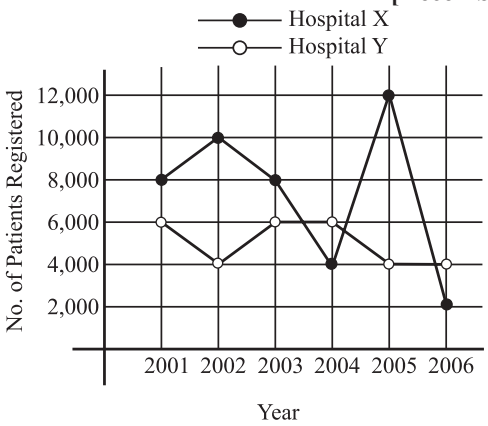
22. In which year the quantity of exports was 100 percent higher than the quantity of previous year?
(a) 2004 (b) 2005
(c) 2006 (d) 2007

23. Which of the four data sets have more dispersion?
[December-2000]

(a)	88	91	90	92	89	91
(b)	0	1	1	0	–1	–2
(c)	3	5	2	4	1	5
(d)	0	5	8	10	–2	–8

DIRECTIONS (Qs. 24-26): Study the following graph and answer the questions.

[December-2009]

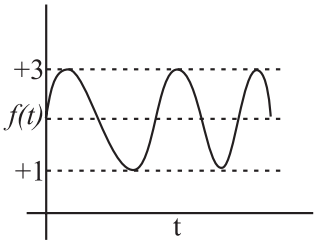


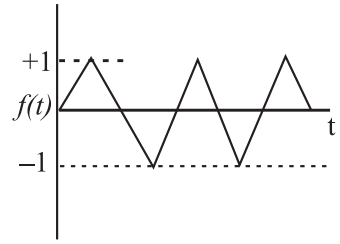
24. In which year total number of patients registered in hospital X and hospital Y was the maximum ?
(a) 2003 (b) 2004 (c) 2005 (d) 2006

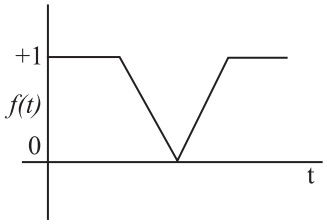
25. What is the maximum dispersion in the registration of patients in the two hospitals in a year ?
(a) 8000 (b) 6000 (c) 4000 (d) 2000

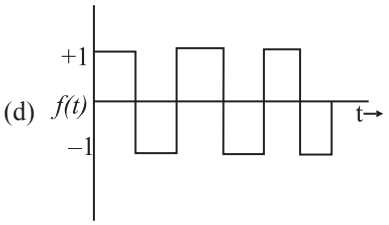
26. In which year there was maximum decrease in registration of patients in hospital X?
(a) 2003 (b) 2004 (c) 2005 (d) 2006

27. Which of the following graphs does not represent regular (periodic) behaviour of the variable f(t)? **[December-2009]**

(a)


(b)


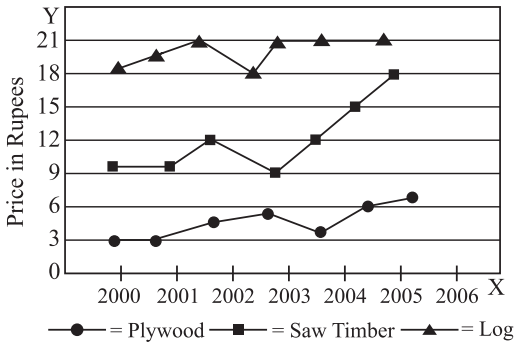
(c)


(d)


28. Which correlation co-efficient best explains the relationship between creativity and intelligence ? **[December-2009]**
(a) 1.00 (b) 0.6 (c) 0.5 (d) 0.3

DIRECTIONS (Qs. 29-31): In the following chart, the price of logs is shown in per cubic metre and that of Plywood and Saw Timber in per tonnes. Study the chart and answer the following questions.

[June-2010]

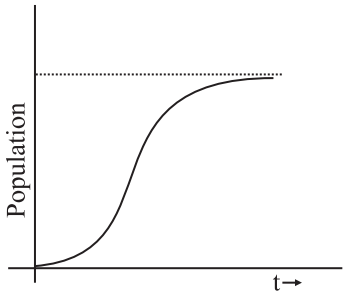


29. Which product shows the maximum percentage increase in price over the period?
(a) Saw timber (b) Plywood
(c) Log (d) None of the above

30. What is the maximum percentage increase in price per cubic metre of log ?
(a) 6 (b) 12 (c) 18 (d) 20

31. In which year the prices of two products increased and that of the third decreased?
(a) 2000 (b) 2002 (c) 2003 (d) 2006

32. The population of a city is plotted as a function of time (years) in graphic form below : **[June-2010]**



Which of the following inference can be drawn from above plot ?
(a) The population increases exponentially.
(b) The population increases in parabolic fashion.
(c) The population initially increases in a linear fashion and then stabilizes.
(d) The population initially increases exponentially and then stabilizes.

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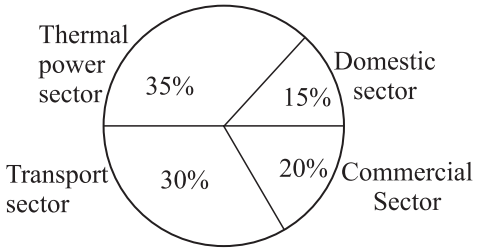
33. Which one of the following methods is best suited for mapping the distribution of different crops as provided in the standard classification of crops in India ? **[June-2011]**
(a) Pie diagram (b) Chorochromatic technique
(c) Isopleth technique (d) Dot method

DIRECTIONS (Qs. 34-35): The total CO_2 emissions from various sectors are 5 mmt. In the Pie Chart given below, the percentage contribution to CO_2 emissions from various sectors is indicated.

[December-2011]

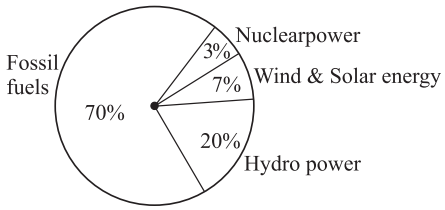


34. What is the absolute CO_2 emission from domestic sector ?
(a) 1.5 mmt (b) 2.5 mmt
(c) 1.75 mmt (d) 0.75 mmt

35. What is the absolute CO_2 emission for combined thermal power and transport sectors ?
(a) 3.25 mmt (b) 1.5 mmt
(c) 2.5 mmt (d) 4 mmt

DIRECTIONS (Qs. 36-37): The total electricity generation in a country is 97 GW. The contribution of various energy sources is indicated in percentage terms in the Pie Chart given below ;

[June-2012]



36. What is the contribution of wind and solar power in absolute terms in the electricity generation ?
(a) 6.79 GW (b) 19.4 GW
(c) 9.7 GW (d) 29.1 GW

37. What is the contribution of renewable energy sources in absolute terms in the electricity generation ?
(a) 29.1 GW (b) 26.19 GW
(c) 67.9 GW (d) 97 GW

HINTS & EXPLANATION

1. (d) By the graph the sale of 'Pep-up' was the maximum in year 1989.

2. (a) Average annual sale of Dew-drop
$= \frac{10 + 15 + 25 + 15 + 30 + 25}{6} = \frac{120}{6} = 20$
Average annual sale of Cool-ship
$= \frac{25 + 7 + 20 + 20 + 25 + 30}{6} = \frac{127}{6} = 21.166$
Average annual sale of Pep-up
$= \frac{30 + 35 + 30 + 25 + 20 + 20}{6} = \frac{160}{6} = 26.66$
So the average sale of Pep-up was maximum.

3. (c) Required per cent $= \frac{35 - 30}{35} \times 100$
$= \frac{5}{35} \times 100 = \frac{100}{7} = 14.28\%$

4. (a) Value per tin in 1995 $= \frac{150}{100} = ₹\ 1{\cdot}5$
Value per tin in 1996 $= \frac{150}{75} = ₹\ 2$
Value per tin in 1997 $= \frac{330}{150} = ₹\ 2{\cdot}2$
Value per tin in 1998 $= \frac{400}{160} = ₹\ 2{\cdot}5$
Value per tin in 1999 $= \frac{500}{200} = ₹\ 2{\cdot}5$
So the value per tin was minimum in 1995.

5. (d) Required difference = 160 – 150 = 10 Lakh tin
= 1000000 tin

6. (d) Required Percentage $= \frac{(500 - 150)}{150} \times 100$
$= \frac{350 \times 2}{3} = \frac{700}{3}$
$= 233.33\%$

7. (c) Required percentage $= \frac{(100 - 75)}{100} \times 100$
$= 25\%$

8. (c) Required value $= \frac{330}{150} \times 160$
$= \frac{330}{15} \times 16$
$= 22 \times 16$
$= ₹\ 352$ crores

9. (b) Football : Hockey = 15 : 15
= 1 : 1

10. (d) Expenditure on basket ball = $12000000 \times \left(12\frac{1}{2}\%\right)$
$= \frac{12000000}{100} \times \frac{25}{2}$
$= \frac{6000000 \times 25}{100}$

$= 60000 \times 25$

$= ₹\ 1500000$

11. (c) By the pie chart Cricket is most popular game.

12. (b) By the option expenditure of Golf and Basket ball is same.

13. (a) Expenditure on Cricket and Hockey

$= 15000000 \times \frac{(25+15)}{100}$

$= 150000 \times 40$

$= 6000000$

14. (d) By graph it is clear that in the year 2000 company f earned maximum percent profit.

15. (a) By graph it is clear that in the year 2001 company a earned minimum percent profit.

16. (a) By graph it is clear that company f earned maximum average percent profit.

17. (b) Circle graphs are used to show how various parts are related to the whole. A pie chart (or a circle chart) is a circular statistical graphic, which is divided into slices to illustrate numerical proportion.

18. (b) By the graph firm 'c' and 'e' got maximum profit growth rate the year 2006.

19. (a) By the graph firm 'b', 'd' and 'f' got maximum profit growth rate in the year 2007.

20. (b) Quantity of engineering gods export was

25 in 2005
50 in 2006
25 in 2004
35 in 2007

Maximum is in year 2006.

21. (b) Charge in value between 2003 - 2004 $= \frac{15-25}{25} \times 100$
$= -40\%$ (negative sign shows decrease)

Change in value between 2006-2007 $= \frac{25-50}{50} \times 100$
$= -50\%$

2007 shows a decrease of 50% over previous year.

22. (c) Change in quantity between 2003-2004
$= \frac{25-15}{15} \times 100 = 66.66\%$

Change in quantity between 2004-2005

$= \frac{25-25}{25}\ 100 = 0\%$

Change in quantity between 2005-2006

$= \frac{50-25}{25} \times 100 = 100\%$

2006 shows 100% higher quantity over previous year.

23. (d) 0 5 8 10 –2 –8

Dispersion, in statistics, is the extent to which a distribution is spread—widely scattered or tightly clustered. The spread of a data set can be described by a range of descriptive statistics including variance, standard deviation, interquartile range or graphs/plots. The range of dispersion in the data set given in (d) is eight points, the highest.

24. (c) In the year 2005 total number of patients registered in hospital x and hospital y was 16000, which is maximum.

25. (a) The maximum disperison in the registration of patients was in the year 2005 which is about 8000.

26. (d) In the year 2006 there are maximum decrease in registration of patients in hospital X, which is 10,000.

27. (c)

28. (a) The correlation coefficient which best explains the relationship between creativity and intelligence is 1.

29. (b) Saw timber $\rightarrow \frac{18-10}{10} \times 100 = 80\%$

Plywood $\rightarrow \frac{7-3}{3} \times 100 = 133.33\%$

Log $\rightarrow \frac{21-18}{18} \times 100 = 16.66\%$

$\therefore$ Plywood shows the maximum percentage Increase in price over the period.

30. (c) Maximum percentage increase in the price per cubic metre of Log from 2003 to 2004

$\Rightarrow \frac{21-18}{18} \times 100 = \frac{3}{18} \times 100 = 16.66\%.$

$= 18\%$ approx.

31. (b) In 2002, the price of Log and saw timber has increased and that of Plywood also increased.

32. (d) It is clear by the graph that the population initally increases exponentially and then stabilizes.

33. (a)

34. (d) Domestic sector emission $= \frac{5 \times 15}{100} = 0{\cdot}75$ mmt.

35. (a) Combined % of emission of CO_2 from thermal and sub transport sector = 30 % + 35% = 65%

Required emission $= 5 \times \frac{65}{100} = 3.25$ mmt

36. (a) Contribution of wind and solar power in absolute terms

$= 97 \times \frac{7}{100} = 6{\cdot}79$ GW.

37. (b) Contribution of renewable energy sources in absolute terms $= \frac{97 \times 27}{100} = 26.19$ GW

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CHAPTER 31

Data Interpretation

Data can be written or represented in 4 Forms (Data can be presented either through words as in case-lets or through pictorial methods. Out of all the types of pictorial charts, table, bar chart, pie chart and line chart are most frequently used types)

- Numerical: Data in the numerical form
- Table Form: Data in Tabular Form
- Mixed form: Data in Mix Form
- Graphical form Like Line, Bar graph, PI Chart etc.

Approximation Techniques

A very large number of these questions check your ability to compare or calculate fractions and percentages. If you sit down to actually calculate the ansewer, you would end up spending more time than required. Here are a few ideas that you can use for approximation.

- Learn the concept of Approximations and Estimations. These are very important to solve DI questions very fast.
- When trying to calculate (approximate) a fraction p/q, add value to the denominator and corresponding value to the numerator before calculating (approximating).
- If the percentage growth rate is r for a period of t years, the overall growth rate is approximate
  rt + t* (t – 1)* r 2/2

EXERCISE

DIRECTIONS (Qs. 1-5): Study carefully the table given below and answer the question asked here under.

[June-2005]

In this table number (in thousands) of six types of toys manufactured by 2 company have been inhered against the respective years of manufacture.

Year	A	B	C	D	E	F	Total
1984	83	105	72	87	69	98	478
1985	74	112	198	82	85	112	583
1986	68	84	132	163	102	169	565
1987	115	98	104	114	96	184	661
1988	85	106	85	92	108	115	556
1989	106	86	116	86	98	102	596
1990	38	108	118	102	108	86	610

1. During which of the following years, production of D types of toys was approximately equal to the average production?
(a) 1989 (b) 1990
(c) 1988 (d) 1985

2. Production of A type of toys in 1984 was approximately what percent of the total combined production of A type of toys during the years 1987 and 1988?
(a) 75 (b) 40
(c) 60 (d) 48

3. What was the difference in the total combined production of D and E type of toys in the year 1987 and that of C and D type of toys in the year 1990?
(a) 1000 (b) 1000000
(c) 10000 (d) 20000

4. During which of the following years percentage of total combined production of F type toys w.r.t the total combined production of all type of toys was at the lowest level?
(a) 1987 (b) 1986
(c) 1989 (d) None of the choices

5. What percent of production of C types of toys approximately declined in 1987 in compares to the year 1986?
(a) 30 (b) 25
(c) 35 (d) 21

DIRECTIONS (Qs. 6-11) : Read the table below and based on this table answer the questions.

[June-2013]

Area under Major Horticulture Crops (in lakh hectares)

Year	Fruits	Vegetables	Flowers	Total Horticulture Area
2005-06	53	72	1	187
2006-07	56	75	1	194
2007-08	58	78	2	202
2008-09	61	79	2	207
2009-10	63	79	2	209

6. Which of the following two years have recorded the highest rate of increase in area under the total horticulture ?
(a) 2005–06 & 2006–07 (b) 2006–07 & 2008–09
(c) 2007–08 & 2008–09 (d) 2006–07 & 2007–08

7. Shares of the area under flowers, vegetables and fruits in the area under total horticulture are respectively :
(a) 1, 38 and 30 percent (b) 30, 38 and 1 percent
(c) 38, 30 and 1 percent (d) 35, 36 and 2 percent

8. Which of the following has recorded the highest rate of increase in area during 2005-06 to 2009-10 ?
(a) Fruits (b) Vegetables
(c) Flowers (d) Total horticulture

9. Find out the horticultural crop that has recorded an increase of area by around 10 percent from 2005-06 to 2009-10
(a) Fruits (b) Vegetables
(c) Flowers (d) Total horticulture

10. What has been the share of area under fruits, vegetables and flowers in the area under total horticulture in 2007- 08?
(a) 53 percent (b) 68 percent
(c) 79 percent (d) 100 percent

11. In which year, area under fruits has recorded the highest rate of increase ?
(a) 2006-07 (b) 2007-08
(c) 2008-09 (d) 2009-10

DIRECTIONS (Qs. 12–15) : In the following table, trends in production of energy in India by primary sources are given. Study the table and answer question (Production in peta Joules)

[September-2013]

Year	Coal & Lignite	Crude Petroleum	Natural Gas	Electricity (Hydro & Nuclear	Total
2006-07	7459	1423	1223	4763	14,868
2007-08	7926	1429	1248	4944	15,547
2008-09	8476	1403	1265	5133	16,277
2009-10	9137	1411	1830	4511	16,889
2010-11	9207	1579	2012	5059	17,857

12. In which year primary sources recorded the lowest growth in total production of energy ?
(a) 2007–08 (b) 2008–09
(c) 2009–10 (d) 2010–11

13. Which source of energy has shown the highest growth rate in production during 2006-07 to 2010-11 ?
(a) Coal & lignite
(b) Crude petroleum
(c) Hydro & nuclear electricity
(d) Total production of energy

14. Which one of the following primary sources of energy has recorded the highest growth in production in 2008–09 ?
(a) Coal & lignite (b) Crude petroleum
(c) Natural gas (d) Hydro & nuclear electricity

15. In which year, production of hydro and nuclear electricity was almost double the production of crude petroleum and natural gas taken together ?
(a) 2006–07 (b) 2007–08
(c) 2008–09 (d) 2009–10

DIRECTIONS (Qs. 16-19) : Following table provides details about the Foreign Tourist Arrivals (FTAs) in India from different regions of the world in different years. Study the table carefully and answer the questions based on this table.

[December-2013]

Region	Number of Foreign Tourist Arrivals		
	2007	2008	2009
Western Europe	1686083	1799525	1610086
North America	1007276	1027297	1024469
South Asia	982428	1051846	982633
South East Asia	303475	332925	348495
East Asia	352037	355230	318298
West Asia	171661	215542	201110
Total FTAs in India	5081504	5282603	5108579

16. Find out the region that contributed around 20 percent of the total foreign tourist arrivals in India in 2009.
(a) Western Europe (b) North America
(c) South Asia (d) South East Asia

17. Which of the following regions has recorded the highest negative growth rate of foreign tourist arrivals in India in 2009?
(a) Western Europe (b) North America
(c) South Asia (d) West Asia

18. Find out the region that has been showing Highest declining trend in terms of share of foreign tourist arrivals in India from 2008 and 2009.
(a) Western Europe (b) South East Asia
(c) East Asia (d) West Asia

19. Identify the region that has shown hyper growth rate of foreign tourist arrivals than the growth rate of the total FTAs from India in 2008.
(a) Western Europe (b) North America
(c) South Asia (d) East Asia

DIRECTIONS (Qs. 20-24) : Read the following table carefully. Based upon this table answer the questions.

[June-2014]

Net Area under Irrigation by sources in a country (Thousand Hectares)

Year	Gov-ern-ment canals	Private canals	Tanks	Tube wells & Other wells	Other sources	Total
1997-98	17117	211	2593	32090	3102	55173
1998-99	17093	212	2792	33988	3326	57411
1999-00	16842	194	2535	34623	2915	57109
2000-01	15748	203	2449	33796	2880	55076
2001-02	15031	209	2179	34906	4347	56672
2002-03	13863	206	1802	34250	3657	53778
2003-04	14444	206	1908	35779	4281	56618
2004-05	14696	206	1727	34785	7453	58867
2005-06	15268	207	2034	35372	7314	60196

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20. Which of the following sources of Irrigation has registered the largest percentage of decline in Net area under irrigation during 1997-98 and 2005-06 ?
(a) Government canals (b) Private canals
(c) Tanks (d) Other sources

21. Find out the source of Irrigation that has registered the maximum improvement in terms of percentage of Net irrigated area during 2002-03 and 2003-04.
(a) Government canals
(b) Tanks
(c) Tube wells and other wells
(d) Other sources

22. In which of the following years, Net irrigation by tanks increased at the highest rate?
(a) 1998-99 (b) 2000-01
(c) 2003-04 (d) 2005-06

23. Identify the source of Irrigation that has recorded the maximum incidence of negative growth in terms of Net irrigated area during the years given in the table.
(a) Government canals
(b) Private canals
(c) Tube wells and other wells
(d) Other sources

24. In which of the following years, share of the tube wells and other wells in the total net irrigated area was the highest ?
(a) 1998-99 (b) 2000-01
(c) 2002-03 (d) 2004-05

DIRECTIONS (Qs. 25-30) : For a county CO_2 emissions (million metric tons) from various sectors are given in the following table. Answer the questions base on the data given

[December-2014]

CO_2 emissions (million metric tones)					
Sector	**Power**	**Industry**	**Com-mercial**	**Agricul-ture**	**DOmes-tic**
2005	500	200	150	80	100
2006	600	300	200	90	110
2007	650	320	250	100	120
2008	700	400	300	150	150
2009	800	450	320	200	180

25. What is the percentage (%) growth of CO_2 emission from power sector during 2005 to 2009?
(a) 60% (b) 50%
(c) 40% (d) 80%

26. Which sector has recorded maximum growth in CO_2 emission during 2005 to 2009 ?
(a) Power (b) Industry
(c) Commercial (d) Agriculture

27. By what percentage (%), the total emissions of CO_2 have increased from 2005 to 2009 ?
(a) ~ 89.32% (b) ~ 57.62%
(c) ~ 40.32% (d) ~ 113.12%

28. What is the average annual growth rate of CO_2 emission in power sector?
(a) ~ 12.57% (b) ~ 16.87%
(c) ~ 30.81% (d) ~ 50.25%

29. What is the percentage contribution of power sector to total CO_2 emission in the year 2008?
(a) ~ 30.82% (b) ~ 41.18%
(c) ~ 51.38% (d) ~ 60.25%

30. In which year, the contribution (%) of industry to total sectoral CO_2 emission was minimum?
(a) 2005 (b) 2006
(c) 2007 (d) 2009

DIRECTIONS (Qs. 31-36) : Questions are based on the tabulated data given below :

[June-2015]

A company has 20 employees with their age (in years) and salary (in thousand rupees per month) mentioned against each of them:

S.No.	**Age (in years)**	**Salary (in thousand rupees per month)**
1.	44	35
2.	32	20
3.	54	45
4.	42	35
5.	31	20
6.	53	60
7.	42	50
8.	51	55
9.	34	25
10.	41	30
11.	33	30
12.	31	35
13.	30	35
14.	37	40
15.	44	45
16.	36	35
17.	34	35
18.	49	50
19.	43	45
20.	45	50

31. Classify the data of age of each employee in class interval of 5 years. Which class interval of 5 years has the maximum average salary?
(a) 35 - 40 years (b) 40 - 45 years
(c) 45 - 50 years (d) 50 - 55 years

32. What is the frequency (%) in the class interval of 30 - 35 years?
(a) 20 % (b) 25 %
(c) 30 % (d) 35 %

33. What is the average age of the employees?
(a) 40.3 years (b) 38.6 years
(c) 47.2 years (d) 45.3 years

34. What is the fraction (%) of employees getting salary ₹ 40,000 per month?
(a) 45% (b) 50%
(c) 35% (d) 32%

35. What is the average salary (in thousand per month) in the age group 40 - 50 years?
(a) 35 (b) 42.5
(c) 40.5 (d) 36.5

36. What is the fraction of employees getting salary less than the average salary of all the employees?
(a) 45% (b) 50%
(c) 55% (d) 47%

37. In an examination 10,000 students appeared. The result revealed the number of students who have : **[June-2015]**

passed in all five subjects	=	5583
passed in three subjects only	=	1400
passed in two subjects only	=	1200
passed in one subject only	=	735
failed in English only	=	75
failed in Physics only	=	145
failed in Chemistry only	=	140
failed in Mathematics only	=	200
failed in Bio-science only	=	157

The number of students passed in at least four subjects is:
(a) 6300 (b) 6900
(c) 7300 (d) 7900

DIRECTIONS (38-43) : Given below in the table is the decadal data of Population and Electrical Power Production of a country. Based on the below table, answer the questions.

[December-2015]

Year	Population (million)	Electrical Power Production (GW)*
1951	20	10
1961	21	20
1971	24	25
1981	27	40
1991	30	50
2001	32	80
2011	35	100
		*1 GW = 1000 million watt

38. Which decade registered the maximum growth rate (%) of population ?
(a) 1961-71 (b) 1971-81
(c) 1991-2001 (d) 2001-2011

39. Average decadal growth rate (%) of population is :
(a) ~ 12.21% (b) ~ 9.82%
(c) ~ 6.73% (d) ~ 5%

40. Based on the average decadal growth rate, what will be the population in the year 2021 ?
(a) 40.34 million (b) 38.49 million
(c) 37.28 million (d) 36.62 million

41. In the year 1951, what was the power availability per person ?
(a) 100 W (b) 200 W
(c) 400 W (d) 500 W

42. In which decade, the average power availability per person was maximum ?
(a) 1981-1991 (b) 1991-2001
(c) 2001-2011 (d) 1971-1981

43. By what percentage (%) the power production increased from 1951 to 2011 ?
(a) 100% (b) 300%
(c) 600% (d) 900%

DIRECTIONS (44-46) : The following table shows the number of people in different age groups who responded to a survey about their favourite style of music. Use this information to answer the questions

[July-2016]

	Number of people		
Age → Style of Music ↓	(Years) 15-20	(Years) 21-30	(Years) 31+
Classical	6	4	17
Pop	7	5	5
Rock	6	12	14
Jazz	1	4	11
Blues	2	3	15
Hip-Hop	9	3	4
Ambient	2	2	2

44. Approximately what percentage of the total sample were aged 21-30 ?
(a) 31% (b) 23%
(c) 25% (d) 14%

45. Approximately what percentage of the total sample indicates that Hip-Hop is their favourite style of music?
(a) 6% (b) 8%
(c) 14% (d) 12%

46. What percentage of respondents aged 31+ indicated a favourite style other that classical music ?
(a) 64% (b) 60%
(c) 75% (d) 50%

DIRECTIONS (47-49) : The following table shows the percentage profit (%) earned by two companies A and B during the years 2011-15. Answer questions based on the data contained in the table:

[July-2016]

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Profit earned by two companies

Year	Percentage Profit (%)	
	A	B
2011	20	30
2012	35	40
2013	45	35
2014	40	50
2015	25	35

Where, percent (%) Profit = $\frac{\text{Income - Expenditure}}{\text{Expenditure}} \times 100$

47. If the total expenditure of the two companies was ₹ 9 lakh in the year 2012 and the expenditure of A and B were in the ratio 2 : 1, then what was the income of the company A in that year ?
(a) ₹ 9.2 lakh (b) ₹ 8.1 lakh
(c) ₹ 7.2 lakh (d) ₹ 6.0 lakh

48. What is the average percentage profit earned by the company B ?]
(a) 35% (b) 42%
(c) 38% (d) 40%

49. In which year, the percentage profit earned by the company B is less than that of company A?]
(a) 2012 (b) 2013
(c) 2014 (d) 2015

DIRECTIONS (Qs. 50-52): Answer the questions based on this information.

[August-2016]

A college has a total of 800 MCA students, 80% of whom are in class MCA-III and remaining are equally divided between class MCA-I and class MCA-II. The proportion of female students and the proportion of vegetarian students in the college are indicated as under through the table.

Proportion of females and proportion of vegetarians in each class		
Class	**Female (F)**	**Vegetarian (V)**
MCA-I	0.40	
MCA-II	0.45	0.50
MCA-III		0.55
Total	0.525	0.53

For example, in the table above, 0.525 is the total proportion of female students and 0.53 is the total proportion of vegetarian students in the college.

50. What is the percentage of female students in class MCA-III?
(a) 40 (b) 45
(c) 50 (d) 55

51. What is the percentage of vegetarian students in class MCAI?
(a) 40 (b) 45
(c) 50 (d) 55

52. How many total non-vegetarian students are there in class MCA-I and class MCA-II? **[August-2016]**
(a) 72 (b) 88
(c) 78 (d) 92

DIRECTIONS (Qs. 53-55): Study these tables I and II and answer the questions that follow

[August-2016]

Consider the following two tables (I and II) that show the percentage of students in each faculty at University and the number of foreign students in the Science faculty. These percentages have been rounded to the nearest whole number. There are a total of 1049 students in the science faculty.

I : Students Faculty wise

Name of Faculty	% of Students
Computing	22
Business	14
Science	23
Engineering	9
Arts	21
Medicine	5
Law	6

II : Foreign Students in Science Faculty

Foreign Students	Number of Science Students
American	79
Australian	4
African	2
Chinese	6
European	21

53. Approximately, what percentage of students in the Science faculty is that of foreign students?
(a) 14% (b) 9%
(c) 30% (d) 11%

54. Approximately, how many students belong to the Engineering faculty?
(a) 420 (b) 410
(c) 390 (d) 400

55. In case, there are 34 European medical students, then approximately, what is their percentage in the medicine faculty?
(a) 13% (b) 18%
(c) 12% (d) 15%

DIRECTIONS (Qs. 56–58) : Answer questions based on the data given below:

[January-2017]

A University professor maintains data on MCA students tabulated by performance and gender of the students. The data is kept on a computer hard disk, but accidently some of it is lost because of a computer virus. Only the following could be recovered:

	Number of MCA Students			
Performance → Gender	Average	Good	Excellent	Total
Male			10	
Female				32
Total		30		

Panic buttons were pressed but to no avail. An expert committee was formed, which decided that the following facts were self evident :

(a) Half the students were either excellent or good.
(b) 40% of the students were females.
(c) One-third of the male students were average.

56. How many female students are excellent ?
(a) 0 (b) 8
(c) 16 (d) 32

57. What proportion of female students are good ?
(a) 0 (b) 0.25
(c) 0.50 (d) 0.75

58. Approximately, what proportion of good students are male?
(a) 0 (b) 0.73
(c) 0.43 (d) 0.27

DIRECTIONS (Qs. 59-61): Answer the questions based on the data contained in the table.

[January-2017]

The table below embodies data on the sales revenue (₹ in lakh) generated by a publishing house during the years 2012-15 while selling books, magazines and journals as three categories of items.

	Sales Revenue (₹ in lakh)			
Year→ Items	**2012**	**2013**	**2014**	**2015**
Journals	46	47	45	44
Magazines	31	39	46	51
Books	73	77	78	78
Total				

59. In 2015, approximately what percent of total revenue came from books ? categories of items, is
(a) 45% (b) 55%
(c) 35% (d) 25%

60. The number of years in which there was an increase in revenue from at least two categories of item is.
(a) 0 (b) 1
(c) 2 (d) 3

61. If the year 2016 were to show the same growth in terms of total sales revenue as the year 2015 over the year 2014, then the revenue in the year 2016 must be approximately :
(a) ₹ 194 lakh (b) ₹ 187 lakh
(c) ₹ 172 lakh (d) ₹ 177 lakh

DIRECTIONS (Qs. 62–66) : Answer the questions based on the data given in the table below.

[November-2017]

Table : Number of registered vehicles in India and India's population.

Year	Total vehicles (Lakhs)	Two wheelers (Lakhs)	Cars, Jeeps, Taxis	Buses (Lakhs)	Goods vehicles (Lakhs)	Others (Lakhs)	Population (India) (Millions)
1961	6.65	0.88	3.1	0.57	1.68	0.42	439.23
1971	18.65	5.76	6.82	0.94	3.43	1.70	548.15
1981	53.91	26.18	11.60	1.62	5.54	8.97	683.32
1991	213.74	142.00	29.54	3.31	13.56	25.33	846.42
2001	549.91	385.56	70.58	6.34	29.48	57.95	1028.73
2011	1417.58	1018.65	191.23	16.04	70.64	121.02	1210.19

62. The maximum decadal growth in population of India is registered in the period:
(a) 1961 - 1971 (b) 1991 - 2001
(c) 2001 - 2011 (d) 1981 - 1991

63. In which year the decadal growth (%) in number of cars surpassed that of the two wheelers ?
(a) 1991 (b) 2001
(c) 1981 (d) 2011

64. What was the average decadal growth in the number of cars during 1961 - 2011 ?
(a) ~ 131% (b) ~ 68%
(c) ~ 217% (d) ~ 157%

65. In the year 2001, out of total number of vehicles, the number of passenger vehicles (4 wheelers) accounted for :
(a) ~ 14% (b) ~ 24%
(c) ~ 31% (d) ~ 43%

66. What was the per capita ownership of two wheelers in India in the year 2011 ?
(a) ~ 0.084 (b) ~ 0.0084
(c) ~ 0.84 (d) ~ 0.068

DIRECTIONS (Qs. 67-71): The table below embodies data on the production, exports and per capita consumption of rice in country P for the five years from 2012 to 2016. Answer the questions based on the data contained in the table.

[July-2018]

Year-wise Production, Exports and Per Capita Consumption of Rice			
Year	**Production (in million kg)**	**Exports (in million kg)**	**Per Capita Consumption (in kg)**
2012	**186.5**	**114**	**36.25**
2013	**202**	**114**	**35.2**
2014	**238**	**130**	**38.7**
2015	**221**	**116**	**40.5**
2016	**215**	**88**	**42**

Where, Per Capita Consumption = (Consumption in million kg) ÷ (Population in million) and consumption (in million kg) = Production-Exports.

67. The percentage increase in the consumption of rice over the previous year was the highest in which year ?
(a) 2013 (b) 2014
(c) 2015 (d) 2016

68. What is the population of the country in the year 2014 (in million)?
(a) 2.64 (b) 2.72
(c) 2.79 (d) 2.85

69. The ratio of exports to consumption in the given period was the highest in the year :
(a) 2012 (b) 2013
(c) 2014 (d) 2015

70. In which year, the population of country was the highest?
(a) 2013 (b) 2014
(c) 2015 (d) 2016

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71. What is the average consumption of rice (in million kg) over the years 2012-2016 ?

(a) 104 (b) 102.1

(c) 108 (d) 100.1

DIRECTIONS(Qs. 72-74): Based on the table, answer the following three questions.

[December-2018]

	The number of candidates Appeared (A), Passed (P) and Selected (S) in a competitive examination in two states					
Year	State X			State Y		
	A	P	S	A	P	S
2010	990	195	48	1120	240	60
2011	650	150	44	960	180	52
2012	840	180	50	885	177	64
2013	780	160	64	1040	220	60
2014	1020	220	72	980	280	68
2015	930	215	70	900	228	48

72. In the year 2012, the % of candidates who failed in State X was nearly :

(a) 80% (b) 90%

(c) 50% (d) 95%

73. In State X, the overall pass % during the period 2010-2015 was nearly:

(a) 5% (b) 40%

(c) 20% (d) 50%

74. In the year 2015, the % of candidates who passed in State X and Y taken together was nearly :

(a) 66% (b) 50%

(c) 25% (d) 10%

DIRECTIONS (Qs. 75-79): Consider the following table that shows the distribution of students in two sections A and B in a school according to the marks obtained by them. There is a total of 45 students in each of the sections A and B. Answer the questions based on the data contained in the table:

[20th June 2019-Ist Shift]

MARKS OBTAINED BY STUDENTS		
Marks in Class Interval	Number of students in	
	Section A	Section B
[0—9]	2	4
[10—19]	5	5
[20—29]	10	9
[30—39]	4	4
[40—49]	8	7
[50—59]	4	5
[60—69]	7	5
[70—79]	5	6

75. How many students in Section A have obtained 30 or more marks but less than 50?

(a) 12 (b) 14

(c) 10 (d) 13

76. If the pass mark is 40, approximately what is the percentage of successful students in Section B?

(a) 48% (b) 51%

(c) 50% (d) 47%

77. How many students in Section A and Section B together have obtained marks less than 10?

(a) 10 (b) 11

(c) 12 (d) 6

78. If the pass mark is 30, what is the number of failures in both the sections together?

(a) 43 (b) 35

(c) 16 (d) 26

79. How many students in Section A and Section B have obtained 50 or more than 50 marks?

(a) 23 (b) 43

(c) 32 (d) 34

DIRECTIONS (Qs. 80-84): Consider the following two tables (I and II) that show the percentage wise distribution (%) of the number of laptops sold by a shopkeeper during a period of six months from April to September 2018 and the ratio between the number of Laptops sold of brand HP (H) and brand DELL (D) during the same six months. A total of 45000 laptops have been sold during these six months Study these tables I and II and answer the questions that follow.

[20th June 2019-IInd Shift]

I. Sale of laptops Month wise		II. Laptops Brand Ratio		
Name of Month	% of Laptops	Name of Month	Ratio	
April	17		H	D
May	22	April	8	7
June	25	May	4	5
July	8	June	3	2
August	12	July	7	5
September	16	August	7	8
		September	7	9

80. What is the total number of laptops sold of brand D during May and June together?

(a) 9500 (b) 10000 (c) 10500 (d) 15000

81. If 35% of the laptops sold of brand H during August were sold at a discount, how many laptops of brand H during that month were sold without a discount?

(a) 882 (b) 1635 (c) 1638 (d) 885

82. The number of laptops sold of brand H during April is approximately what percent of the number of laptops sold of brand H during September?

(a) 110 (b) 140 (c) 130 (d) 150

83. If the shopkeeper earned a profit of ₹434 on each laptop sold of brand D during July, what was his total profit earned on the laptops of that brand during the same month?
(a) 6,51,900 (b) 6,46,500
(c) 6,49,500 (d) 6,51,000

84. What is the ratio of the number of laptops sold of brand D during April to those sold during September of the same brand?
(a) 119 : 145 (b) 116 : 135
(c) 119 : 135 (d) 119 : 130

DIRECTIONS (Qs. 85-89): Consider the following table that shows the total number of tickets sold of five movies P, Q, R, S and T, across two cinema houses A and B on a particular day. In accordance with the table, answer the questions that follow.

[21st June 2019-Ist Shift]

Sale of Movie Ticket Cinema house wise

Movies	Cinema	
	A	B
P	200	300
Q	350	400
R	250	350
S	300	350
T	400	250

85. What is the total number of tickets sold of movies Q and R together at both the Cinemas A and B together?
(a) 1050 (b) 1200
(c) 1250 (d) 1350

86. What is the ratio of the number of tickets sold of movie P at Cinema B to the number of tickets sold of movie Q at Cinema B?
(a) 2:3 (b) 3:4
(c) 1:2 (d) 3:5

87. The number of tickets sold of movie T at Cinema house A is what percent of the number of tickets of movie P sold at Cinema A?
(a) 220% (b) 200%
(c) 210% (d) 190%

88. What is the average number of tickets sold at Cinema B for movies T and S together?
(a) 360 (b) 320
(c) 300 (d) 340

89. What is the difference between the total number of tickets sold of all movies together at Cinema A and the total number of tickets sold of all movies together at Cinema B?
(a) 180 (b) 170
(c) 150 (d) 160

DIRECTIONS (Qs. 90-94) Consider the following table that shows the percentage (%) distribution of population of six cities A-F, ratio of males to females and the percentage (%) of adult population in these cities. Total population of these six cities is 24 lakhs. In accordance with the table, answer the questions.

[21st June 2019-IInd Shift]

Population city wise

City	% of population	Male : Female	% Adult
A	21	4 : 3	60
B	18	5 : 4	64
C	16	5 : 3	72
D	20	2 : 3	70
E	10	1 : 1	75
F	15	3 : 2	65

90. What is the difference between the number of males and the number of females in City B?
(a) 42000 (b) 44000
(c) 45000 (d) 48000

91. The number of adults in City R is what percent of the number of males in City D?
(a) 82.5% (b) 87.75%
(c) 92.5% (d) 93.75%

92. What is the total number of male population in City D?
(a) 1.88 lakh (b) 1.92 lakh
(c) 1.96 lakh (d) 2.04 lakh

93. What is the number of persons in City C who are not adult?
(a) 107520 (b) 108410
(c) 109560 (d) 110800

94. What is the number of persons of City F who are adult?
(a) 232000 (b) 230000
(c) 234000 (d) 242000

DIRECTIONS (Qs. 95-99): Consider the following table that shows the number (in lakhs) of different sizes of LED television sets sold by a company over the last seven years from 2012 to 2018. Answer the questions based on the data contained in the table:

[24th June 2019-Ist Shift]

Sale of LED television sets (in lakhs) of different sizes (in inches)

Year	Size of LED Television sets (in inches)				
	22''	24''	32''	40''	49''
2012	85	154	124	112	118
2013	100	136	112	94	136
2014	106	124	85	115	145
2015	115	100	160	100	85
2016	100	85	145	85	100
2017	115	70	175	55	130
2018	125	95	170	110	155

95. What is the total sale of Television sets of size 49 – inches (in lakhs) over all the seven years?
(a) 912 (b) 896
(c) 879 (d) 869

96. What was the approximate percentage increase/decrease in the sales of 32–inch LED Television sets in 2017 compared to that in 2013?
(a) 36% (b) 56%
(c) 57% (d) 64%

97. For which size LED Television sets is the total sales of all the seven years the maximum?
(a) 22–inch Television
(b) 24–inch Television
(c) 32–inch Television
(d) 49–inch Television

98. What is the difference in the number of 40–inch Television sets sold in 2013 and 2018?
(a) 1,600,000 (b) 1,500,000
(c) 15,000,000 (d) 16,000,000

99. For which LED television set is the total sales of all the seven years the minimum?
(a) 22–inch Television
(b) 24–inch television
(c) 49–inch television
(d) 40–inch television

DIRECTIONS (Qs. 100-104): Consider the following table that shows the production of fertilizers by a company (in 10000 tonnes) during the year 2011 to 2018. Answer the questions based on the data contained in the table:

[24th June 2019-IInd Shift]

Year	Production of fertilizers
2011	35
2012	50
2013	70
2014	55
2015	75
2016	60
2017	85
2018	90

100. What was the approximate percentage increase in production of fertilizers in 2018 compared to that in 2011?
(a) 157% (b) 165%
(c) 177% (d) 182%

101. In how many of the given years was the production of fertilizers more than the average production of the given years?
(a) 2 (b) 3
(c) 4 (d) 5

102. The average production of 2012 and 2013 was exactly equal to the average production of which of the following pairs of years?
(a) 2011 and 2012 (b) 2011 and 2017
(c) 2012 and 2014 (d) 2015 and 2016

103. In which year, the percentage increase in production as compared to the previous year was maximum?
(a) 2012 (b) 2013
(c) 2015 (d) 2018

104. What was the percentage decline in the production of fertilizers from 2013 to 2014?
(a) 20.4% (b) 21.4%
(c) 22.6 % (d) 24.2%

DIRECTIONS (Qs. 105–109) : Consider the following table that shows the total number of students and percentage of females and males in five different departments. Answer the questions based on the data contained in the table.

[25th June 2019-Ist Shift]

Department	*Percentage of Females*	*Percentage of Males*	*Total No. of Students*
Physics	45	55	460
Chemistry	35	65	550
English	55	45	300
Hindi	60	40	250
Mathematics	40	60	500

105. The total number of students in the Chemistry department forms approximately what percent of the total number of students in the mathematics department?
(a) 90% (b) 95%
(c) 105% (d) 110%

106. What is the respective ratio of the number of male students in English Department to the number of male students in Mathematics department?
(a) 9 : 12 (b) 9 : 20
(c) 3 : 5 (d) 45 : 60

107. Which of the departments has maximum number of female students?
(a) Physics (b) Chemistry
(c) English (d) Mathematics

108. Which of the department has minimum number of male students?
(a) Physics (b) English
(c) Hindi (d) Mathematics

109. What is the total number of females in English and hindi departments together?
(a) 315 (b) 325
(c) 335 (d) 345

DIRECTIONS (Qs. 110-114): Consider the following table that shows percentage profit earned by company ABC and company XYZ during the year 2011-2016. Answer the question based on the data contained in the table

[25th June 2019-IInd Shift]

Year	Percent profit earned by company ABC	Percent profit earned by company XYZ
2011	**50**	**55**
2012	**70**	**60**
2013	**50**	**45**
2014	**40**	**50**
2015	**60**	**50**
206	**80**	**75**

110. If the amount of profit earned by company XYZ in 2012 was ₹ 9 Lakh, what was the total investment?
(a) 12,00,000 (b) 15,00,000
(c) 16,00,000 (d) 18,00,000

111. If the income of company ABC in 2013 and that in 2015 were equal and the amount invested in 2013 was ₹ 8,00,000 what was the amount invested in 2015?
(a) 7,50,000 (b) 9,00,000
(c) 10,50,000 (d) 12,00,000

112. If the profit earned by company ABC in the year 2015 was ₹ 6,60,000, what was the total income of the company in that year?
(a) 11,000,00 (b) 14,300,00
(c) 17,600,00 (d) 20,900,00

113. If each of the companies ABC and XYZ invested ₹ 20 lakh in 2014, what was the average profit earned by the two companies?
(a) ₹ 8 lakh (b) ₹ 10 lakh
(c) ₹ 9 lakh (d) ₹ 12 lakh

114. If the amounts invested by the two companies in 2015 were equal, what was the ratio of the total income of company ABC to that of company XYZ in 2015
(a) 5 : 6 (b) 6 : 5
(c) 15 : 16 (d) 16 : 15

DIRECTIONS (Qs. 115-119): Read the following comprehension and answer the questions.

Consider the following table that shows expenditures of a company (in lakh rupees) per annum over the given years. Answer the questions based on the data contained in the table:

[26th June 2019-Ist Shift]

Year	Salary	Transport	Bonus	Interest on Loans	Taxes
2008	150	90	2.00	20.0	80
2009	180	100	2.50	30.5	95
2010	200	110	2.75	35.5	105
2011	240	115	3.00	40.0	85
2012	250	125	3.25	42.5	100

115. The total amount of bonus paid by the company during the given period is approximately what percent of the total amount of salary paid during this period?
(a) 0.9% (b) 1.3% (c) 1.6% (d) 2.0%

116. The approximate ratio between the total expenditure on taxes for all the years and the total expenditure on transport for all the years is:
(a) 31:40 (b) 25:36 (c) 27:30 (d) 31:36

117. What is the average amount of interest per year which the company had to pay (in Rupees) during this period?
(a) 30.5 Lakh (b) 32.7 Lakh
(c) 33.7 Lakh (d) 35.5 Lakh

118. The approximate ratio between the total expenditure of the company in the year 2008 and the total expenditure of the company in the year 2009 is:
(a) 57:75 (b) 52:68 (c) 57:68 (d) 68:57

119. Total expenditure of all the items in 2008 was approximately what percent of the total expenditure in 2012?
(a) 66% (b) 69%
(c) 72% (d) 75%

DIRECTIONS (Qs. 120-124): *Study the information provided and answer the questions based on them.*

The year-wise student strength in a university from different zones of the country in addition to those students who are from foreign countries shown in table given below.

[26th June 2019-IInd Shift]

Student Strength (in hundreds)

Year	North-Zone	South-Zone	Central-Zone	West-Zone	East-Zone	Foreign countries
2014	15.1	10.2	6.2	4.0	8.2	1.2
2015	16.2	11.5	5.8	4.1	7.8	1.6
2016	17.2	11.8/	6.0	4.6	8.5	1.7
2017	17.4	10.8	6.5	4.8	7.6	1.8
2018	18.0	10.6	6.4	6.4	8.6	2.0

120. Which category of students have registered overall maximum growth rate (%) from 2014 to 2018?
(a) Foreign countries (b) West Zone
(c) North Zone (d) East Zone

121. During the period 2014-2018, which zone exhibits cyclic variation?
(a) East zone (b) West zone
(c) Central zone (d) South zone

122. What is the mean of annual growth rates (%) of the student strength of north zone?
(a) 6.24 (b) 4.51
(c) 3.86 (d) 4.82

123. Which was the year when the students from east zone had maximum representation (%) in the total student strength of the university?
(a) 2016 (b) 2018
(c) 2014 (d) 2015

124. What was the percentage (%) of students from foreign countries in the year 2018?
(a) ~4.21% (b) ~3.52%
(c) ~5.24% (d) ~4.85%

DIRECTIONS (Qs. 125-129): The following table gives the percentage (%) of people having knowledge of different programming languages. Assuming that the total number of people having knowledge about programming language is 12, 00,000 answer the questions that follow the table:

[2nd Dec. 2019-Ist Shift]

Programming Language	% of People having knowledge
C++	15%
C	25%
COBOL	12%
FORTRAN	13%
Java	15%
LISP	10%
Python	10%

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125. What is the average percentage (%) of people having knowledge of programming language —Python. LISP and Java?
(a) 1.04%
(b) 11.7%
(c) 266%
(d) 11.0%

126. The ratio of the number of people having knowledge about C to that of knowledge about Java is
(a) 3: 5 (b) 5: 3
(c) 1 : 1 (d) 5: 2

127. Difference in the number of people having knowledge of C and COBOL Programming languages is
(a) 1, 20,000 (b) 1, 80,000
(c) 1, 44,000 (d) 1, 56,000

128. The total number of people having knowledge about C. Java and COBOL is
(a) 4,80,000 (b) 5, 04,000
(c) 5, 16,000 (d) 6, 24,000

129. How many people have knowledge about C language?
(a) 1, 80,000 (b) 3, 00,000
(c) 1, 56,000 (d) 1, 44,000

DIRECTIONS (Qs. 130-134): The following table gives the percentage of marks obtained by five students in five subjects. Maximum marks in each subject are given in the parenthesis below the subject name.

[2nd Dec. 2019-IInd Shift]

Student	Percentage (%) Marks obtained				
	Maths (100)	Chemistry (150)	Physics (150)	English (1000)	Physical Education
A	90	80	95	80	90
B	80	75	90	70	80
C	100	95	95	85	95
D	75	70	60	65	60
E	60	50	65	50	70

130. In which subject, the students have obtained lowest average (%) percentage of marks?
(a) Chemistry (b) Physics
(c) English (d) Physical Education

131. What is the difference between aggregate marks obtained by A and C?
(a) 40.5 (b) 41.5
(c) 42.5 (d) 43.5

132. The aggregate percentage of marks obtained by C are:
(a) 92.20% (b) 94.17%
(c) 95.21% (d) 91.17%

133. What is the average percentage of marks obtained by the students in Chemistry?
(a) 74% (b) 79%
(c) 80% (d) 81%

134. The aggregate of marks obtained by E is :
(a) 252.5 (b) 251.5
(c) 353.5 (d) 352.5

DIRECTIONS (Qs. 135-139) : The following table gives the sales of computers of different types or brands over the years 2001 to 2007. Based on data, answer the questions.

[3rd Dec. 2019-Ist Shift]

Number of different types of computers sold
(In thousands).

Years	Types of Computers			
	Lenovo	Acer	IBM	HCL
2001	20	40	50	80
2002	30	25	60	70
2003	50	50	50	55
2004	60	70	40	35
2005	70	85	70	25
2006	80	45	80	20
2007	90	60	100	10

135. The percentage increase in the sales of Lenovo computers in 2007 compared to sales in 2001 is :
(a) 200% (b) 250%
(c) 300% (d) 350%

136. Name the type of computer for which the total sale in all the seven years is maximum?
(a) IBM (b) Lenovo
(c) Acer (d) HCL

137. Name the type/brand of computer whose sale has decreased continuously over the years 2001 to 2007?
(a) Lenovo (b) Acer
(c) IBM (d) HCL

138. In which year, the percentage of Acer computers sold as to the total number of computers sold, was maximum?
(a) 2003 (b) 2004
(c) 2005 (d) 2007

139. The difference in the number of Acer computers sold in 2002 and 2005 is
(a) 15,000 (b) 20,000
(c) 45,000 (d) 60,000

DIRECTIONS (Qs. 140-144): Consider the table given below for total exports of six countries over five years (in crores of rupees) and answer the questions:

[3rd Dec. 2019-IInd Shift]

Year/ Country	2008	2009	2010	2011	2012
A	20	40	60	45	90
B	30	25	15	50	100
C	50	55	70	90	65
D	45	60	20	15	25
E	60	50	55	100	110
F	24	40	60	75	120

Assume : Profit = Export - Import

140. What is the percentage increase in the export of all the countries together from the year 2009 to 2011 ?
(a) 35 8/9% (b) 38 8/9%
(c) 40 8/9% (d) 38 7/8%

141. If the ratio of export to import in country F and country D are 4 : 1 and 1 : 2 respectively in the year 2008. then what is the total import of country F and D together in that particular year? (in crores of rupees)
(a) 44 (b) 65
(c) 92 (d) 96

142. By what precent is the average export of country E over all the given years more than the average export of country C over all the years?
(a) 13 7/11% (b) 14 7/11%
(c) 13 5/7% (d) 14 5/7%

143. What was the profit of all the countries together in the year 2012 if the total imports of all the countries together was rupees 385 crore?
(a) Rupees 510 crore (b) Rupees 280 crore
(c) Rupees 160 crore (d) Rupees 125 crore

144. If the export of country A in the year 2013 is 20% more than the total export of country B in 2011 and the export of country E in 2010 together. then what was the profit of A in the year 2013 if its import was Rupees 92 crore for that year? (In crores of rupees)
(a) 10 (b) 22
(c) 34 (d) 46

DIRECTIONS (Qs. 145-149): The following table gives the percentage of marks obtained by 6 students in 5 different subjects in an examination. The numbers in the parenthesis give the maximum marks in each subject. Answer the given questions based on the table:

[4th Dec. 2019-Ist Shift]

Subject (Max. Marks) Name of student	Percentage (%) of marks obtained				
	Maths (150)	Chemistry (130)	Physics (120)	Biology (100)	English (100)
Ankit	90	50	80	60	70
Amar	100	60	70	40	80
Sanya	90	60	85	80	60
Rahul	80	75	65	90	90
Puneet	80	85	70	85	50
Pooja	70	75	50	80	40

145. What was the aggregate of marks obtained by Sanya in all the five subjects?
(a) 375 (b) 395
(c) 455 (d) 475

146. In which subject the performance of the students is worst in terms of percentage of marks?
(a) Chemistry (b) Physics
(c) Biology (d) English

147. How many students obtained 60% and above marks in all the subjects?
(a) Three (b) Two
(c) One (d) Zero

148. What is the average mark obtained by all the six students in Chemistry?
(a) 86.66 (b) 76.66
(c) 66.66 (d) 60.00

149. What is the overall percentage of marks obtained by Amar?
(a) 70% (b) 72%
(c) 60% (d) 58.33%

DIRECTIONS (Qs. 150-154): The following table presents the data on the number of vehicles of three different types (A, B and C) produced by a company during seven different years from 2012 to 2018. Based on the data in the table, answer the questions.

[4th Dec. 2019-IInd Shift

Year-Wise production of three types of vehicles

Vehicle → / Year ↓	A - Type	B - Type	C - Type
2012	5000	20000	15000

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2013	15,000	10000	22500
2014	10,000	15000	30000
2015	17,500	15000	23000
2016	25,000	20,000	15000
2017	13,000	25,000	20000
2018	30,000	35,000	25000

150. In how many years was the production of A - type vehlcles less than its average production over the given years?
(a) 2 (b) 4
(c) 3 (d) 1

151. What was the average number of B-type vehicles produced by the company over the years?
(a) 20000 (b) 25000
(c) 15000 (d) 30000

152. The number of A -type vehicles produced in the year 2014 was what percent (%) of the number of C-type vehicles produced in the year 2018?
(a) ~33.83 % (b) ~66.67 %
(c) 50 % (d) 15 %

153. in which of the following years was the total production of vehicle type B was highest ?
(a) 2018 (b) 2017
(c) 2012 (d) 2013

154. In which of the following years was the total production of all the three types of vehicles 60000?
(a) 2013 (b) 2014
(c) 2015 (d) 2016

DIRECTIONS (Qs. 155-159): The table below embodies data on the number of students admitted in three different colleges (A, B and C) during six different years from 2014 to 2019. Based on the data continued in the table, answer the question.

[5th Dec. 2019-Ist Shift]

Year - Wise Number of Admitted students in different colleges:

College → / Year↓	A	B	C
2014	8000	14000	11000
2015	15000	17000	13000
2016	17000	23000	19000
2017	13000	27000	23000
2018	22000	26000	24000
2019	27000	18000	16000

155. What is the approximate percent (%) increase in the number of students admitted in college A in the year 2016 as compared to previous year?
(a) 23% (b) 123%
(c) 113% (d) 13%

156. Total number of students admitted in college C over all the years was approximately what percent (%) of total number of students admitted in all the three colleges together in the year 2017?
(a) 168% (b) 162%
(c) 158% (d) 175%

157. What is the difference between the total number of students admitted in college A overall the years together and the total number of students admitted in college C in the year 2018 and 2019 together?
(a) 6400 (b) 62000
(c) 64000 (d) 61000

158. What is the average number of students admitted in college A in the year 2015, in college B in the year 2016, and in college C in the year 2019 together? ‘
(a) 18000 (b) 24000
(c) 17000 (d) 28000

159. Which college was the number of students admitted in the year 2016 second lowest and the number of students admitted in the year 2018 minimum respectively?
(a) College C and College B
(b) College B and College A
(c) College C and College A
(d) College A and College B

DIRECTIONS (Qs. 160-164): The table below presents the percentage profit earned by two companies A and B during the period 2013 to 2018. Based on the data given in the table, answer five questions that follow

[5th Dec. 2019-IInd Shift]

Yearwise percentage (%) profit

Year	% Profit Earned	
	A	B
2013	20%	35%
2014	32%	30%
2015	40%	50%
2016	25%	40%
2017	30%	30%
2018	15%	40%

$$[\text{Where profit\%} = \frac{\text{Income} - \text{Expenditure}}{\text{Expenditure}} \times 100]$$

160. In which year is the ratio of income to expenditure of company A at maximum?
(a) 2013 (b) 2017
(c) 2015 (d) 2018

161. If the sum of expenditure of company B in the years 2014 and 2017 together is 48 lakhs, then what is the total income of company B in these two years together?
(a) 62.4 Lakhs (b) 36.2 Lakhs
(c) 64.0 Lakhs (d) 65.5 Lakhs

162. If the expenditure of company B in the year 2013 was 17 Lakhs, then what was its income in the year?
(a) 22.95 Lakhs (b) 23.15 Lakhs
(c) 24.50 Lakhs (d) 25.65 Lakhs

163. If the expenditure of company A in the year 2013 and company B in the year 2018 are the same, and the income of company B in the year 2018 is 77 lakhs, then what is the income company A in the year 2013?
(a) 55 Lakhs (b) 66 Lakhs
(c) 56 Lakhs (d) 64 Lakhs

164. If the income of company A in the year 2017 is 26 Lakhs, then what is the expenditure of company A in that year?
(a) 33.8 Lakhs (b) 22.5 Lakhs
(c) 21.6 Lakhs (d) 20.0 Lakhs

DIRECTIONS (Qs. 165-169): Consider of the following table that shows the amount of exports (in crore) from three different companies A, B, and C over these years 2012-2018. Based on the date in the table. **[6th Dec. 2019-Ist Shift]**

Year-wise amount of Exports from companies

Year	Amount of exports (In crore Rs)		
	A	B	C
2012	40	90	70
2013	70	50	100
2014	50	70	130
2015	80	70	100
2016	110	90	70
2017	60	110	90
2018	130	150	110

165. In how many of the given years, were the exports from company A more than its average annual exports over the given years?
(a) 2 (b) 3
(c) 4 (d) 5

166. In which year, the absolute difference between the exports from companies A and B was the minimum?
(a) 2013 (b) 2014
(c) 2015 (d) 2016

167. What was the difference between the average exports of three companies in 2017 and the average exports of three companies in 2012?
(a) 15.33 crores (b) 18.67 crores
(c) 25 crores (d) 20 crores

168. For which of the following pairs of years, the total exports from the three companies put together are equal?
(a) 2014 and 2017 (b) 2015 and 2017
(c) 2016 and 2017 (d) 2014 and 2015

169. Average annual amount of exports during the given period for company B is approximately what percent (%) of the average annual amount of exports for company C?
(a) 64% (b) 21%
(c) 94% (d) 33%

DIRECTIONS (Qs. 170-174): Based on the data in the table, answer the questions that follow:

[6th Dec. 2019-IInd Shift]

The table shows the percentage (%) profit earned by the company A. Income of company B and expenditure of company B during the years, 2013-18 as well as formula to complete percentage (%) profit.

Year-wise Financial Details (in ₹ lakhs)

Year	% profit of A	Income of B (in ₹ lakhs)	Expenditure of B (in ₹ lakhs)
2013	40%	48.6	36
2014	25%	35	25
2015	60%	62.4	48
2016	40%	77	44
2017	10%	80	50
2018	20%	72	45

$$\text{Where profit (\%)} = \frac{(\text{Income} - \text{Expenditure})}{(\text{Expenditure})} \times 100$$

170. If the expenditure of Company A in year 2017 was ₹ 45 Lakhs, then the net profit (in ₹ Lakhs) of Company A is what percent of net profit (in ₹ Lakhs) of Company B in the same year?
(a) 15% (b) 25% (c) 40% (d) 75%

171. In the income of the Company A in the year 2014 happened to be ₹ 32.5 Lakhs, then what was the sum of the net profit (in ₹ Lakhs) of Company A and Company B in 2014?
(a) ₹ 12.8 Lakhs
(b) ₹ 13.2 Lakhs
(c) ₹ 15 Lakhs
(d) ₹ 16.5 Lakhs

172. The percent profit of Company B was maximum in the year?
(a) 2014 (b) 2015
(c) 2016 (d) 2017

173. If the income of Company A in the year 2018 was ₹ 90 Lakhs, then the net profit (in ₹ Lakhs) of Company B in 2018 is what percent more than the net profit (in ₹ Lakhs) of Company A?
(a) 30% (b) 60%
(c) 75% (d) 80%

174. What is the difference between percent(%) profit of Company A and Company B in the year 2013?
(a) 5% (b) 7%
(c) 12% (d) 15%

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HINTS & EXPLANATION

1. **(b)** average production of D type toys

$= \frac{87+82+163+114+92+86+102}{7} = \frac{726}{7} = 103$

So, we can say that the production of D type toys in 1990 in equal to the average production.

2. **(b)** Production of A type toys in 1984 = 83.

S total combined production of A type of toys in 1987 & 1988 = 115 + 85 = 200

$\therefore$ Required % $= \frac{83}{200}\times 100 = 41.5 = 40\%$ (approx)

3. **(b)** Total combined production of D and E type of toys in 1987 = 114 + 96 = 210

& total combined production of C and D type of toys in 1990 = 118 + 102 = 220

$\therefore$ required difference = 220 – 210 = 10 thousands

= 10000

4. **(c)** Total combined production of all type of toys

$= \frac{565}{4005}\times 100 = 14.10$

% of total combined production of F type toys in 1987 is $\frac{184}{866}\times 100 = 21.24\%$

% of total combined production of F type toys in 1986 is $\frac{169}{866}\times 100 = 19.51\%$

% of total combined production of F type toys in 1989 is $\frac{102}{866}\times 100 = 11.77\%$

So, in the year 1989, the percentage of total combined production of F type toys is the lowest level w.r.t. the total combined production of all type of toys.

5. **(d)** Production of C type toys in 1986 = 132

Production of C type toys in 1987 = 104

$= \frac{132-104}{132}\times 100 = 21.2\% = 21\%$ (approx)

6. **(b)** (i) 2005-06 & 2006-07

$= \frac{194-187}{187}\times 100 = 3.74\%$

(ii) 2006-07 & 2008-09

$= \frac{207-194}{194}\times 100 = 6.701\%$

(iii) 2007-08 & 2008-09

$= \frac{207-202}{202}\times 100 = 2.47\%$

(iv) 2006-07 & 2007-08

$= \frac{202-194}{194}\times 100 = 4.12\%$

7. **(a)** Total horticultural area

= 187 + 194 + 202 + 207 + 209 = 999 Lakh hect.

Total flowers area

= 1 + 1 + 2 + 2 + 2 = 8 Lakh hect.

Percentage area under flowers $= \frac{8}{999}\times 100 \cong 0.8\%$

Total area under Vegetation

= 72 + 75 + 78 + 79 + 79 = 383 Lakh hect.

Percentage area under vegetation $= \frac{383}{999}\times 100 \cong 38.3\%$

Total area under Fruits

= 53 + 56 + 58 + 61 + 63 = 291 Lakh hect.

Percentage area under fruits $= \frac{291}{999}\times 100 \cong 29.1\%$

Hence, correct option is (a).

8. **(c)** (i) Fruits: $\frac{63-53}{53}\times 100 = 18.86\%$

(ii) Vegetables: $\frac{79-72}{72}\times 100 = 9.72\%$

(iii) Flowers: $\frac{2-1}{1}\times 100 = 100\%$

(iv) Total Horticutture: $\frac{209-187}{187}\times 100 = 11.76\%$

9. **(b)** Percentage increase in area under

Fruits: $\frac{63-53}{53}\times 100 \approx 18.86\%$

Vegetables: $\frac{79-72}{72}\times 100 = 9.77\% \cong 10\%$

Flowers: $= \frac{2-1}{1}\times 100 = 100\%$

Total horticulture: $= \frac{209-187}{187}\times 100$

$= 11{\cdot}7\% \cong 12\%$

Hence, correct option is (b).

10. **(b)** Area under fruits, vegetables and flowers in year 2007–08

= 58 + 78 + 2= 138 Lakh hect.

Area under horticulture in year 2007–08 = 202 Lakh hect.

Percentage of area $= \frac{138}{202}\times 100 = 68.33\%$

11. **(a)** Rate of increase of area under fruits.

in year 2006-07 $= \frac{56-53}{53}\times 100 = 5.6\%$

in year 2007-08 $= \frac{58-56}{56}\times 100 = 3.5\%$

in year 2008-09 $= \frac{61-58}{58}\times 100 = 5.17\%$

in year 2009-10 $= \frac{63-61}{61}\times 100 = 3.27\%$

12. (c) Growth in total production of energy:

For year 2007–08 $= \frac{15547-14868}{14868}\times 100 = 4.57\%$

For year 2008–09 $= \frac{16277-15547}{15547}\times 100 = 4.69\%$

For year 2009–10 $= \frac{16889-16277}{16277}\times 100 = 3.76\%$

For year 2010–11 $= \frac{17857-16889}{16889}\times 100 = 5.73\%$

$\therefore$ For year 2009-10 growth rate in total production of energy was minimum.

13. (a) Coal and lignite $= \frac{9207-7459}{7459} \times 100 = 23.43\%$

Crude petroleum $= \frac{1579-1423}{1423} \times 100 = 10.9\%$

Hydro and nuclear electricity

$= \frac{5059-4763}{4763} \times 100 = 6.2\%$

Total production of energy

$= \frac{17857-14868}{14868} = 20.1\%$

Coal and lignite has the highest growth rate during 2006–07 to 2010–11.

14. (a) For 2008–09

Coal and lignite $= \frac{8476-7926}{7926} \times 100 = 6.93\%$ {Highest growth}

Crude and petroleum $= \frac{1403-1429}{1429} \times 100$

$= -1.81\%$ (decrease)

Natural gas $= \frac{1265-1248}{1248} \times 100 = 1.36\%$

Hydro and nuclear electricity $= \frac{5133-4944}{4944} \times 100$

$= 3.82\%$

15. (c) Coal and lignite has the highest growth rate in 2008-09.

	Crude Petrol + Natural gas	**Hydro & Nuclear Electricity**
2006–07	2646	4763
2007–08	2677	4944
2008–09	2668	5133
2009–10	3241	4511

For 2008–09 Hydro and Nuclear Electricity is roughly doubled of Crude Petrol + Natural Gas.

16. (b) In 2009, around 20% of total foreign tourist

$5108579 \times \frac{20}{100} = \frac{518579}{5} = 1021715{\cdot}8$

Hence, it is around as North America.

17. (a) Western Europe $= \frac{1610086-1799525}{1799525}\times 100 = -10.52\%$

North America $= \frac{1024469-1027297}{1027297}\times 100 = -0.27\%$

South Asia $= \frac{982633-1051846}{1051846}\times 100 = -6.58\%$

West Asia $= \frac{201110-215542}{215542}\times 100 = -6.69\%$

South East Asia $= \frac{348495-332925}{332925}\times 100 = +4.67\%$

East Asia $= \frac{318298-355230}{355230}\times 100 = -10.39\%$

Option (a) Western Europe is the correct option.

18. (a) According to the previous solution highest declining trend is in western Europe from 2008 to 2009.

19. (c) W.E. $= \frac{1799525-1686083}{1686083}\times 100 = 6.72\%$

N.A. $= \frac{1027297-1007276}{1007276}\times 100 = 1.98\%$

S.A. $= \frac{1051846-982428}{982428}\times 100 = 7.06\%$

E.A. $= \frac{355230-352037}{352037}\times 100 = 0.90\%$

Total FTA, in Indian

$= \frac{5282603-5081504}{5081504}\times 100 = 3.95\%$

option (c) is correct option.

20. (c) Percentage decline from 1997-98 to 2005-06 are as follow—

(a) Form Government Canals—

Decline $= 17117 - 15268 = 1849$

% Decline $= \frac{1849\times 100}{17117}$

$= \frac{184900}{17117}$

$= 10{\cdot}80\%$

(b) For private Canals—

Decline $= 211 - 207 = 4$

% Decline $= \frac{4\times 100}{211}$

$= \frac{400}{211}$

$= 1{\cdot}89\%$

(c) For tanks—

Decline $= 2593 - 2034 = 559$

% Decline $= \frac{559\times 100}{2593}$

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$$= \frac{55900}{2593}$$

$$= 21{\cdot}55\%$$

(d) For Other Sources—

There is no Decline recorded in Other Source.

Hence, largest percentage has been registered in Tanks.

21. (d) a. Government Canals

$$= 14444 - 13863 = 581$$

$$\% = \frac{581}{13863} \times 100 = \frac{5810}{13863} = 4\%$$

b. Tanks $= 1908 - 1802 = 106$

$$\% = \frac{106}{1802} \times 100 = \frac{10600}{1802} = 5.9\%$$

c. Tube-wells and other wells

$$= 35779 - 34250 = 1529$$

$$\% = \frac{1529}{34250} \times 100 = \frac{152900}{34250} = 4\%$$

d. Other sources $= 4281 - 3657 = 624$

$$\% = \frac{624}{3657} \times 100 = \frac{62400}{3657} = 17\%$$

Clearly other sources given maximum.

Hence, correct answer is (d).

22. (d) A. 1998-99 $\Rightarrow 2792 - 2593 = 199$

$$\% = \frac{199}{2593} \times 100 = \frac{19900}{2593} = 7\%$$

B. 2000-01 $\Rightarrow 2449 - 2535 = -86$

negative sign shows decrease

C. 2003-04 $\Rightarrow 1908 - 1802 = 106$

$$\% = \frac{106}{1802} \times 100 = \frac{10600}{1802} = 5.8\%$$

D. 2005-06 $\Rightarrow 2034 - 1727 = 307$

$$\% = \frac{307}{1727} \times 100 = \frac{30700}{1727} = 17\%$$

Hence, 2005-06 net irrigation by tanks increases at the highest rate.

23. (a) From the table it is clear that maximum negative growth happened in Government Canals.

24. (c)

25. (a) Growth of CO_2 from power sector during 2005 to 2009

$$= 800 - 500 = 300$$

$$\% \text{ growth} = \frac{300}{500} \times 100 = 60\%$$

26. (d) Power $\longrightarrow 800 - 500 = 300$

$$\% = \frac{300}{500} \times 100 = 60\%$$

Industry $\longrightarrow 450 - 200 = 250$

$$\% = \frac{250}{200} \times 100\ 125\%$$

Commercial $\longrightarrow 320 - 150 = 170$

$$\% = \frac{170}{150} \times 100$$

$$= \frac{340}{3} = 113\%$$

Agriculture $\longrightarrow 200 - 80 = 120$

$$\% = \frac{120}{80} \times 100 = 150\%$$

Domestic $\longrightarrow 180 - 100 = 80$

$$\% = \frac{80}{100} \times 100 = 80\%$$

Hence, maximum growth in CO_2 is Agriculture.

27. (a) Total emissions of CO_2 in 2005

$$= 500 + 200 + 150 + 80 + 100$$

$$= 1030$$

Total emissions of CO_2 in 2009

$$= 800 + 450 + 320 + 200 + 180$$

$$= 1950$$

$$\text{increased} = 1950 - 1030 = 920$$

$$\% \text{ increased} = \frac{920}{1030} \times 100 = 89.32\%$$

28. (a) In power sector 2005 to 2006

$$= \frac{100}{500} \times 100 = 20\%$$

$$\text{In 2006 to 2007} = \frac{50}{600} \times 100 = 8.33\%$$

$$\text{In 2007 to 2008} = \frac{50}{650} \times 100 = 7.69\%$$

$$\text{In 2008 to 2009} = \frac{100}{700} \times 100 = 14.28\%$$

Average Annual growth rate

$$= \frac{20 + 8.33 + 7.69 + 14.28}{4} = \frac{50.30}{4} = 12.57\%$$

29. (b) Required % in $2008 = \frac{700}{1700} \times 100 = \frac{700}{17} = 41.18\%$

30. (a) % in 2005

$$= \frac{200}{500 + 200 + 150 + 80 + 100} \times 100\%$$

$$= \frac{200}{1030} \times 100\% = 19.41\%$$

% in 2006

$$= \frac{300}{600 + 300 + 200 + 90 + 110} \times 100\%$$

$$= \frac{300}{1300} \times 100\% = 23.03\%$$

% in 2007

$$= \frac{320}{650 + 320 + 250 + 100 + 120} \times 100\%$$

$= \frac{320}{1440} \times 100\% = 22.22\%$

% in 2009

$= \frac{450}{800+450+320+200+180} \times 100\%$

$= \frac{450}{1950} \times 100\% = 23.08\%$

31. (d) **30– 35 years** (Sr. no. 2, 5, 9, 11, 12, 13, 17)

$\frac{20+20+25+30+35+38+35}{7} = \frac{200}{7} = 28.57$

35– 40 years (Sr. no. 14, 16)

Average Salary

$\frac{40+35}{2} = \frac{75}{2}$ = 37.5 thousand/month

40-45 years : (Sr. no. 1, 4, 7, 10, 15, 19)

Average Salary $\frac{35+35+50+30+45+45}{6}$

$= \frac{240}{6}$ = 40 thousand/month

45-50 years : (Sr. no. 18, 20)

Average Salary $\frac{50+50}{2} = \frac{100}{2}$ = 50 thousand/month

50-55 years : (Sr. no. 5, 6, 8)

Average Salary $\frac{45+60+55}{3} = \frac{160}{3}$

= 53.3 thousand/month

Hence, the 50-55 class interval has the maximum average salary.

32. (d) Required % = $\frac{7}{20} \times 100 = 35\%$

33. (a) Total age of 20 employees = 424 + 382 = 806 years

Average = $\frac{806}{20}$ = 40.3 years

34. (a) Required % = $\frac{9}{20} \times 100 = 45\%$

35. (b) **45-50 years :**

Total salary = 35 + 35 + 50 + 30 + 45 + 50 + 45 + 50

= 340 thousand

Required average salary $\frac{340}{8} = 42.5$

36. (c) Total Salary of 20 workers

= (375 + 400) thousand = 775 thousand

Average salary = $\frac{775}{20}$ = 38.75 thousand

No. of employ getting salary less than 38.75 is 11

Required % = $\frac{11}{20} \times 100 = 55\%$

37. (a) The number of students passed in atleast four subjects

= 75 + 145 + 140 + 200 + 157 + 5583

= 6300

38. (a) Growth rate (%) of population in decade

1961-71: $\left(\frac{24-21}{21}\right) \times 100 = \frac{3}{21} \times 100 = 14.285\%$

1971-81: $\left(\frac{27-24}{24}\right) \times 100 = \frac{3}{24} \times 100 = 12.5\%$

1991-2001: $\left(\frac{32-30}{30}\right) \times 100 = \frac{2}{30} \times 100 = 6.67\%$

2001-2011: $\left(\frac{35-32}{32}\right) \times 100 = \frac{3}{32} \times 100 = 9.375\%$

$\therefore$ Maximum growth rate (%) of population registered on 1961-71.

39. (b) Average decadal growth rate (%) of population

$= \frac{5 + 14.28 + 12.5 + 11.11 + 6.67 + 9.38}{6} \approx 9.82\%.$

40. (b) Projected population in 2021

$= 35 + \frac{35 \times 9.82}{100} = 35 + 3.437 = 38.437$ million.

41. (d) Power availability for person in year 1951

$= \frac{10 \times 1000}{20} = 500$ W

42. (c) Average power availability per person in decade

1981-1991: $\frac{(40+50) \times 1000}{(27+30)} \cong 1579$ W

1991-2001: $\frac{(50+80) \times 1000}{(30+32)} \cong 2097$ W

2001-2011: $\frac{(80+100) \times 1000}{(32+35)} \cong 2686.5$ W

1971-1981: $\frac{(25+40) \times 1000}{(24+27)} \cong 1274.5$ W

So, average power availability per person was maximum in 2001-2011.

43. (d) Percentage (%) increase in power production from 1951 to 2011

$= \left(\frac{100-10}{10}\right) \times 100 = 900\%.$

44. (c) Required percentage $= \frac{33}{33+33+68} \times 100$

$= \frac{33}{134} \times 100$

$= 24.62\% = 25\%$

45. (d) Required percentage $= \frac{9+3+4}{134} \times 100$

$= \frac{16}{134} \times 100$

$= 11.94\% = 12\%$

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46. (c) Required percentage

$$= \frac{(5+14+11+15+4+2)}{(17+5+14+11+15+4+2)}$$

$$= \frac{51}{68} \times 100 = 75\%$$

47. (b) Total expenditure of Company A in the year 2012

$$= 9 \times \frac{2}{3} = ₹\ 6 \text{ lakh}$$

Total expenditure of Company B in the year 2012

$$= 9 \times \frac{1}{3} = ₹\ 3 \text{ lakh}$$

Let ₹ x was the income of the Company A in the year 2012

$$₹\ 35 = \frac{x - 6,00,000}{6,00,000} \times 100$$

x = ₹ 8,10,000 or 8.1 lakh

48. (c) Required Average Profit Percentage %

$$= \frac{30+40+35+50+35}{5}$$

$$= \frac{190}{5} = 38\%$$

49. (b) Required year is 2013, the percentage profit earned by the company B is less than that of company A.

50. (d) Total MCA students = 800

Students in MCA III = 80% of 800

$$= \frac{80}{100} \times 800 = 640$$

Remaining student = 800 – 640 = 160

So student in MCA Class I - 80 × .40 = 32

Student in MCA Class III - 80 × .45 = 36

∴ Total female students = 800 × .525

= 420

∴ % of female students in class MCA III

= 420 – 68 = 352

∴ % of female students in class MCA III

$$= \frac{352}{640} \times 100 = 55\%$$

51. (a) % of vegetarian students in class MCA I

$$= \frac{32}{80} \times 100 = 40\%$$

52. (b) Total Non-veget arian students in MCA I - 48

total Non-veget arian students in MCA II - 40

Total non-vegetarian = 48 + 40 = 88

53. (d) % of students in the Science faculty is that of foreign students

$$= \frac{112}{1049} \times 100 = 10.6 = 11\% \text{ (approx)}$$

54. (b) We know that the total students in Science faculty = 1049.

Student belongs to Engineering faculty

= 23% = 1049

$$9\% = \frac{1049}{23} \times 9 = 410$$

55. (d) % of medicine faculty = 5%

we know that student in science faculty

23% = 1049

$$5\% = \frac{1049}{23} \times 5 = 228$$

There are 34 European medical students

Then the % of medicine faculty

$$= \frac{34}{228} \times 100 = 14.91\% = 15\% \text{ (approx)}$$

Sol. (56 -58):

Gender	Number of MCA Students			
	Performance			
	Average	**Good**	**Excellent**	**Total**
Male	**16**	**22**	10	**48**
Female	**24**	**08**	**0**	32
Total	**40**	30	**10**	**80**

56. (a) Number of Female Students are Excellent = 0

57. (b) Required Proportion = $\frac{8}{32} = 0.25$

58. (b) Required Proportion = $\frac{22}{30} = 0.73$

Sol. (59-61):

Items	Sales Revenues (₹ in lakh)			
	Year			
	2012	**2013**	**2014**	**2015**
Journals	46	47	45	44
Magazines	31	39	46	51
Books	73	77	78	78
Total	**150**	**163**	**169**	**173**

59. (a) Required % $= \frac{78}{173} \times 100 = \frac{7800}{173} = 45\%$ (Approx.)

60. (c) Those years are 2013 & 2014.

61. (d) Revenue in 2015 = 44 + 51 + 78

= 173 lakh

Revenue in 2014 = 45 + 46 + 78

= 169 lakh

Difference = 173 – 169 = 4 lakh

∴ Revenue in 2016 = 173 + 4 = 177 lakh

62. (a) Decadal growth rate in population during 1991-2001

$$= \frac{1028.73 - 846.42}{846.42} \times 100 = 21.53\%$$

⇒ Decadal growth during 2001–2011

$$\frac{1210.19 - 1028.73}{1028.73} \times 100 = 17.63\%$$

⇒ Decadal growth during 1981–1991

$$= \frac{846.42 - 683.32}{683.32} \times 100 = 23.86\%$$

and decadal growth during 1961–1971

$$= \frac{548.15 - 439.23}{439.23} \times 100 = 24.79\%$$

$\therefore$ The maximum decadal growth in population of India is registered in the period of 1961–1971.

63. (d) Decadal growth rate of two wheelers in the year 2011

$$= \frac{1018.65 - 385.56}{385.56} \times 100$$
$$= 164.20\%$$

and decadal growth rate of cars in year 2011,

$$= \frac{191.23 - 70.58}{70.58} \times 100$$
$$= 170.94\%$$

Hence, in year 2011, the decadal growth (%) in the number of cars surpassed that of the two wheelers.

64. (a) Increased % of 1961–1971

$$= \frac{6.82 - 3.1}{3.1} \times 100 = 120\%$$

Increased % of 1971–1981

$$= \frac{11.60 - 6.82}{6.82} \times 100 \simeq 70\%$$

Increased % 1981–1991

$$= \frac{29.54 - 11.60}{11.60} \times 100 \simeq 154\%$$

Increased % 1991–2001

$$= \frac{70.58 - 29.54}{29.54} \times 100 \simeq 139\%$$

Increased % 2001–2011

$$= \frac{191.23 - 70.58}{70.58} \simeq 171\%$$

Required average growth %

$$= \frac{120 + 70 + 154 + 139 + 171}{5}$$

$$= \frac{654}{5} = 130.8 \simeq 131\%$$

65. (a) The total number of vehicles in 2001

$$= 549.91$$

and number of passenger vehicles

$$= (70.58 + 6.34) \quad = 76.92$$

$\therefore$ Required percentage $= \frac{76.92}{549.91} \times 100$

$$= 13.98\%$$
$$\approx 14\%$$

66. (a) Per capita ownership of two wheelers in India in the year 2011

$$= \frac{1018.65 \times 10^5}{1210.19 \times 10^6} \approx 0.084$$

67. (b)
$2016 \Rightarrow \quad 42 \quad - \ 40.5 \quad = 1.5$
$2015 \Rightarrow \quad 40.5 \quad - \ 38.7 \quad = 1.8$
$2014 \Rightarrow \quad 38.7 \quad - \ 35.2 \quad = \boxed{3.5}$
$2013 \Rightarrow \quad 35.2 \quad - 36.25 \quad = -1{\cdot}05$

68. (c) Population in the year 2014 $= \frac{238 - 130}{38.7} = 2.79$ Million

69. (a) Ratio of exports to consumption

$$= \frac{\text{Export}}{\text{Consumption (in million kg)}}$$

$$= \frac{\text{Export}}{\text{Production} - \text{Export}}$$

In the year 2015 = 116/105 = 1.10
In the year 2012 = 114/72.5 = 1.57
In the year 2013 = 114/88 = 1.29
In the year 2014 = 130/108 = 1.20

70. (d) Population $= \frac{\text{Production} - \text{Export}}{\text{Per capita consumption}}$

Population in 2012 $= \frac{186.5 - 114}{36.25} = \frac{72.5}{36.25} = 2$ million

Population in 2013 $= \frac{202 - 114}{35.2} = \frac{88}{35.2} = 2.5$

Population in 2014 $= \frac{238 - 130}{38.7} = \frac{108}{38.7} = 2.79$

Population in 2015 $= \frac{221 - 116}{40.5} = \frac{105}{40.5} = 2.59$

Population in 2016 $= \frac{215 - 88}{42} = \frac{127}{42} = 3.02$

So, Population is highest in 2016.

71. (d) Average Consumption of rice

$$= \frac{(186.5-114) + (202-114) + (238-130) + (221-116) + (215-88)}{5}$$

$$= \frac{72.5 + 88 + 108 + 105 + 127}{5} = \frac{500.5}{5} = 100.1$$

72. (a) In the year 2012,
Total no of student in State 'Y' in 2012 = 840
Failed student = 840 – (180) = 660
$\therefore$ % of candidates who failed in state X

$$= \frac{\text{failed student}}{\text{total student}} \times 100 = \frac{610}{840} \times 100$$

$= 72.61 \cong 80\%$ (approx)

73. (c) Total student appeared in state "x" in 2015 = 5210
Total pass students = 1120

$\therefore$ Required % $= \frac{1120}{5210} \times 100 = 21.49 = 20\%$ (approx)

74. (c) in the year 2015, the % of the candidates who passed in state x and y

$$= \frac{215 + 228}{900 + 930} \times 100 = \frac{443}{1830} \times 100 = 24.20\%$$

$= 25\%$ (approx)

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Sol. (75–79):

Marks in class interval	Number of students	
	Section A	Section B
(0–9)	2	4
(10–19)	5	5
(20–29)	10	9
(30–39)	4	4
(40–49)	8	7
(50–59)	4	5
(60–69)	7	5
(70–79)	5	6

75. (a) Number of students in section A have obtained marks (30 – 39) = 4

(40 – 49) = 8

∴ Number of students obtained between 30 to 50 = 4 + 8 = 12.

76. (b) Number of students in Section B have obtained more than 40 marks = 7 + 5 + 5 + 6 = 23

Total number of students in Section B = 45

Percentage of students obtained more than 40

$= \frac{23}{45} \times 100 = 51.11\% \approx 51\%$

77. (d) Number of students in Section A, obtained less than 10 marks = 2

Number of students in Section B, obtained less than 10 marks = 4

Total number of students in both Section A and B obtained less than 10 marks = 2 + 4 = 6.

78. (b) Number of students in Section A obtained less than 30 marks = 2 + 5 + 10 = 17.

Number of students in Section B obtained less than 30 marks = 4 + 5 + 9 = 18.

Total number of failures in both Sections

= 17 + 18 = 35.

79. (c) Number of students in Section A have obtained more than 50 marks = 4 + 7 + 5 = 16.

Number of students in Section B have obtained more than 50 marks = 5 + 5 + 6 = 16.

Total number of students have obtained more than 50 marks in both Sections

= 16 + 16 = 32.

80. (b) Number of laptop of brand D sold in May

$= 45000 \times \frac{22}{100} \times \frac{5}{(4+5)}$

$= 45000 \times \frac{22}{100} \times \frac{5}{9} = 5500$

Number of laptop of brand D sold in June

$= 45000 \times \frac{25}{100} \times \frac{2}{(3+2)}$

$= 45000 \times \frac{25}{100} \times \frac{2}{5} = 4500$

Total number of laptop of brand D sold in two months

= 5500 + 4500 = 10000

81. (c) Number of laptop of brand H sold in August

$= 45000 \times \frac{12}{100} \times \frac{7}{(7+8)}$

$= 45000 \times \frac{12}{100} \times \frac{7}{15} = 2520$

Percent of laptop of brand H sold on without discount

= 100 – 35 = 65%

Number of such laptop = $2520 \times \frac{65}{100} = 1638$

82. (c) Number of laptop of brand H sold in April

$= 45000 \times \frac{17}{100} \times \frac{8}{15}$

Number of laptop of brand H sold in September

$= 45000 \times \frac{16}{100} \times \frac{7}{16}$

Required % = $\frac{45000 \times \frac{17}{100} \times \frac{8}{15}}{45000 \times \frac{16}{100} \times \frac{7}{16}} \times 100$

$= \frac{17 \times 8}{7 \times 15} \times 100 = 129.52\% \approx 130\%$

83. (d) Number of laptop of brand D sold in July

$= 45000 \times \frac{8}{100} \times \frac{5}{12} = 1500$

Total profit of the shopkeeper

= 434 × 1500 = 6,51,000

84. (c) Number of laptop of brand D sold in April

$= 45000 \times \frac{17}{100} \times \frac{7}{15}$

Number of laptop of brand D sold in September

$= 45000 \times \frac{16}{100} \times \frac{9}{16}$

Required ratio = $\frac{45000 \times \frac{17}{100} \times \frac{7}{15}}{45000 \times \frac{16}{100} \times \frac{9}{16}}$

$= \frac{17 \times 7}{15 \times 9} = \frac{119}{135}$

85. **(d)** Total number of tickets sold of movie Q and R at both the cinemas A and B together.
= 350 + 400 + 250 + 350 = 1350

86. **(b)** Tickets sold at cinema B of movie P = 300
Tickets sold of movie Q at cinema B = 400
Required ratio = $\frac{300}{400}$ = 3 : 4

87. **(b)** Ticket sold of movie T at cinema A = 400
Ticket sold of movie P at cinema A = 200
Required percent = $\frac{400}{200}\times 100$ = 200%

88. **(c)** Average ticket sold for movie 'T' and S together at cinema
B = $\frac{350+250}{2} = \frac{600}{2}$ = 300

89. **(c)** Total ticket sold at cinema A
= 200 + 350 + 250 + 300 + 400 = 1500
Total ticket sold at cinema B
= 300 + 400 + 350 + 350 + 250 = 1650
∴ Difference = 1650 – 1500 = 150

90. **(d)** Total population of city B
= $24 \times \frac{18}{100}$
Male population of city B
= $24 \times \frac{18}{100} \times \frac{5}{9}$ = 2.4 lakhs
Female population of city B
= $24 \times \frac{18}{100} \times \frac{4}{9}$ = 1.92 lakhs
Difference in population
= 2.4 – 1.92 = 0.48 lakhs = 48000

91. **(d)** Total population of city E = $24 \times \frac{10}{100}$ = 2.4 lakhs
Adult population of city E = $2.4 \times \frac{75}{100}$ = 1.8 lakhs
Number of female population of city B
= $24 \times \frac{18}{100}\times\frac{4}{9}$ = 1.92 lakhs
Required percent = $\frac{1.8}{1.92}\times 100$ = 93.75%

92. **(b)** Total number of male population of city D
= $24\times\frac{20}{100}\times\frac{2}{5}$ = 1.92 lakhs

93. **(a)** Number of persons in city C who are not adult
= $24\times\frac{16}{100}\times\left(\frac{100-72}{100}\right)$
= $\frac{24\times 16}{100}\times\frac{28}{100}$ = 1.0752 lakhs = 107520

94. **(c)** Number of persons of city F, who are adults
= $24\times\frac{15}{100}\times\frac{65}{100}$ = 2.3400 lakhs = 234000

95. **(d)** Total sale (in lakhs) of television sets of size 49" over the seven years.
= 118 + 136 + 145 + 85 + 100 + 130 + 155
= 869 lakhs

96. **(b)** Sales of 32" TV in 2017 = 175
Sales of 32" TV in 2013 = 112
Percentage increase in sales
= $\left(\frac{175-112}{112}\right)\times 100$ = 56.25% ≈ 56%

97. **(c)** Total sales of TV over all the seven years
for the size 22"
= 85 + 100 + 106 + 115 + 100 + 115 + 125
= 746 lakhs
for the size 24"
= 154 + 136 + 124 + 100 + 85 + 70 + 95
= 764 lakhs
for the size 32"
= 124 + 112 + 85 + 160 + 145 + 175 + 170
= 971 lakhs
for the size 49"
= 869 lakhs
Hence, sale is maximum for 32" TV.

98. **(a)** Sales difference of 40" TV sales in year 2018 and 2013
= 110 – 94 = 16 lakhs = 1600000

99. **(d)** Total sales of TV, size 22" = 746 Lakhs.
Total sales of TV, size 24" = 764 Lakhs
Total sales of TV, size 32" = 971 Lakhs
Total sales of TV, size 49" = 869 Lakhs
Sales of 40" TV over all the years
= 112 + 94 + 115 + 100 + 85 + 55 + 110
= 671 lakhs, which is minimum.

100. **(a)** Increase in production of fertilizers in 2018 compared to 2011 = 90 – 35 = 55
Percentage increase = $\frac{55}{35}\times 100$ = 157%

101. **(c)** Average production of fertilizer
= $\frac{35+50+70+55+75+60+85+90}{8}$ = 65
Hence, production is more than average production in year 2013, 2015, 2017 and 2018.

102. **(b)** Average production of fertilizers in 2012 and 2013
= $\frac{50+70}{2}$ = 60
Average production of fertilizers in 2011 and 2017
= $\frac{35+85}{2}$ = 60

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103. (a) Percentage increase in production in

year 2012 $= \left(\frac{50-35}{35}\right)\times 100 = \frac{15}{35}\times 100$
$= 42.85\%$

year 2013 $= \left(\frac{70-50}{50}\right)\times 100 = \frac{20}{50}\times 100$
$= 40\%$

year 2015 $= \left(\frac{75-55}{55}\right)\times 100 = \frac{20}{55}\times 100$
$= 36.36\%$

year 2018 $= \left(\frac{90-85}{85}\right)\times 100 = 5.9\%$

Hence, percentage increase is maximum in year 2012.

104. (b) Percentage decline in production from 2013 to 2014

$= \left(\frac{70-55}{70}\right)\times 100$

$= \frac{15}{70}\times 100 = 21.4\%$

105. (d) Total number of students in chemistry department
$= 550$

Total number of students in mathematics department
$= 500$

Required percent $= \frac{550}{500}\times 100 = 110\%$

106.(b) Number of male students in English department

$= 300\times\frac{45}{100} = 135$

Number of male students in Mathematics department

$= 500\times\frac{60}{100} = 300$

Required ratio $= \frac{135}{300} = 9 : 20$

107. (a) Number of female students in Physics

$= 460\times\frac{45}{100} = 207$

Number of female students in Chemistry

$= 550\times\frac{35}{100} = 193$

Number of female students in English

$= 300\times\frac{55}{100} = 165$

Number of female students in Mathematics

$= 500\times\frac{40}{100} = 200$

Hence, Physics dept. has maximum female.

108. (c) Number of male students in Physics
$= 460 - 207 = 253$

Number of male students in English
$= 300 - 165 = 135$

Number of male students in Hindi

$= 250\times\frac{40}{100} = 100$

Number of male students in Mathematics
$= 500 - 200 = 300$

Hence, Hindi department has minimum number of male student.

109.(a) Number of female in Hindi department
$= 250 - 100 = 150$

Total number of famale in English and Hindi department $= 165 + 150 = 315$

Sol. (110-114):

	ABC	XYZ
Year	Profit %	Profit %
2011	50	55
2012	70	60
2013	50	45
2014	40	50
2015	60	50
2016	80	75

110. (b) Let company XYZ investment in 2012 is ₹ x.

then, $x\times\frac{60}{100} = 900000$

$x = \frac{900000\times 100}{60} = ₹\ 15,00,000$

111.(a) Profit of company ABC in 2013

$= 800000\times\frac{50}{100} = 400000$

$\therefore$ Income in 2013 = 800000 + 400000 = 1200000

Again, let investment of ABC in 2015 is ₹ x.

then , $x\times\frac{60}{100} = (1200000 - x)$

$x = \frac{1200000\times 100}{160} = ₹\ 750000$

112. (c) Let investment of ABC in 2015 is ₹ x.

then, $x\times\frac{60}{100} = 660000$

$x = \frac{660000\times 100}{60} = 1100000$

Income of company ABC in 2015
= Investment + Profit
= 1100000 + 660000 = ₹ 1760000

113. (c) Average profit earned by two companies

$= \frac{\text{Total profit earned by two companies}}{2}$

$$= \frac{\left(20\times\frac{40}{100}+20\times\frac{50}{100}\right)\times10^5}{2}$$

$$= \frac{(8+10)\times10^5}{2} = ₹\ 9 \text{ lakh}$$

114.(d) Let amount invested by each company in 2015 is ₹ x.

$$\text{then, } \frac{\text{Income of ABC}}{\text{Income of XYZ}} = \frac{x+x\times\frac{60}{100}}{x+x\times\frac{50}{100}}$$

$$= \frac{1.6\,x}{1.5\,x} = 16:15$$

115.(b) Total amount of bonus paid by the company
= 2 + 2.5 + 2.75 + 3 + 3.25
= 13.5
Total amount of salary paid by the company
= 150 + 180 + 200 + 240 + 250
= 1020

$$\text{Required percent} = \frac{13.5}{1020}\times100 = 1.32\%$$

116.(d) Total expenditure on taxes for all the year
= 80 + 95 + 105 + 85 + 100 = 465
Total expenditure on transport for all the year
= 90 + 100 + 110 + 115 + 125 = 540

$$\text{Required ratio} = \frac{465}{540} = \frac{31}{36}$$

117. (c) Average amount of interest per year

$$= \frac{20+30.5+35.5+40+42.5}{5}$$

$$= \frac{168.5}{5} = 33.7 \text{ lakh}$$

118. (c) Ratio

$$= \frac{\text{Total expenditure in 2008}}{\text{Total expenditure in 2009}}$$

$$= \frac{150+90+2+20+80}{180+100+2.5+30.5+95} = \frac{342}{408} = \frac{57}{68}$$

119.(a) Required percent

$$= \frac{\text{Total expenditure in 2008}}{\text{Total expenditure in 2012}}\times100$$

$$= \frac{150+90+2+20+80}{250+125+3.25+42.5+100}\times100 = 66\%$$

120. (a) Percentage growth rate from 2014 to 2018 for :
Foreign Countries

$$= \left(\frac{2.5-1.2}{1.2}\right)\times100 = 108.33\%$$

$$\text{West Zone} = \left(\frac{5.4-4}{4}\right)\times100 = 35\%$$

$$\text{North Zone} = \left(\frac{18-15.1}{15.1}\right)\times100 = 19.2\%$$

$$\text{East Zone} = \left(\frac{8.6-8.2}{8.2}\right)\times100 = 4.88\%$$

Hence, maximum growth rate is registered for foreign countries.

121.(a) For East Zone number of students increases and decreases alternately for every next year. Hence East Zone show cyclic variation.

122.(b) Growth % for North Zone in following years:

$$\text{Year 2015 : } \left(\frac{16.2-15.1}{15.1}\right)\times100 = 7.28\%$$

$$\text{Year 2016 : } \left(\frac{17.2-16.2}{16.2}\right)\times100 = 6.17$$

$$\text{Year 2017 : } \left(\frac{17.4-17.2}{17.2}\right)\times100 = 1.16$$

$$\text{Year 2018 : } \left(\frac{18-17.4}{17.4}\right)\times100 = 3.45\%$$

Mean of growth rate (%)

$$= \frac{7.28+6.17+1.16+3.45}{4} = 4.51\%$$

123.(c) Percent of students from East Zone in following years :
Year 2014 :

$$\frac{8.2}{(15.1+10.2+6.2+4+8.2+1.2)}\times100 = 18.26\% \text{ (Maximum)}$$

$$\text{Year 2015 : } \frac{7.8}{(16.2+11.5+5.8+4.1+7.8+1.6)}\times100 = 16.6\%$$

$$\text{Year 2016 : } \frac{8.5}{(17.2+11.8+6+4.5+8.5+1.7)}\times100 = 17.1\%$$

$$\text{Year 2018 : } \frac{8.6}{(18+10.6+6.4+5.4+8.6+2.5)}\times100 = 16.7\%$$

124. (d) Percent of students from foreign countries in year 2018 :

$$= \frac{2.5}{(18+10.6+6.4+5.4+8.6+2.5)}\times100 \approx 4.85\%$$

125. (b) Average percentage (%) of people having programming language - Python, LISP and Java

$$= \frac{15+10+10}{3} \approx 11.7\%$$

126. (b) $\frac{\text{People having knowledge about C}}{\text{People having knowledge about Java}} = \frac{25}{15} = \frac{5}{3}$

127. (d) Number of people having knowledge of *C*

$$= 1200000\times\frac{25}{100} = 3{,}00{,}000$$

Number of people having knowledge of Cobol

$$= 1200000\times\frac{12}{100} = 1{,}44{,}000$$

Difference in number of peoples
= 3,00,000 – 1,44,000 = 1,56,000

128. (d) Total number of people having knowledge of *C*, Java and COBOL

$= 12,00,000 \times \left(\frac{25}{100} + \frac{15}{100} + \frac{12}{100}\right)$

$= 12,00,000 \times \frac{52}{100} = 6,24,000$

129.(b) Number of people having knowledge about 'C' language

$= 12,00,000 \times \frac{25}{100} = 3,00,000$

130. (c) Average percentage marks in Subject :

Math = $\frac{90+80+100+75+60}{5} = 81\%$

Chemistry = $\frac{80+75+95+70+50}{5} = 74\%$

Physics = $\frac{95+90+95+60+65}{5} = 81\%$

English = $\frac{80+70+85+65+50}{5} = 70\%$

Physical Education = $\frac{90+80+95+60+70}{5} = 79\%$

Hence, lowest average (%) marks is in subject English.

131. (c) Aggregate marks obtained by A

$= 100 \times \frac{90}{100} + 150 \times \frac{80}{100} + 150 \times \frac{95}{100} + 100 \times \frac{80}{100} + 100 \times \frac{90}{100}$

= 90 + 120 + 142.5 + 80 + 90 = 522.5

Aggregate marks obtained by *C*

$= 100 \times \frac{100}{100} + 150 \times \frac{95}{100} + 150 \times \frac{95}{100} + 100 \times \frac{85}{100} + 100 \times \frac{95}{100}$

= 100 + 142.5 + 142.5 + 85 + 95 = 565

Difference = 565 – 522.5 = 42.5.

132. (b) Total marks obtained by 'C' in 5 different subjects

= 100 + 142.5 + 142.5 + 85 + 95 = 565

Total marks of all five subjects

= 100 + 150 + 150 + 100 + 100 = 600

Aggregate percent of marks = $\frac{565}{600} \times 100 = 94.17\%$

133. (a) Marks obtained in Chemistry by student

$A = 150 \times \frac{80}{100} = 120$

$B = 150 \times \frac{75}{100} = 112.5$

$C = 150 \times \frac{95}{100} = 142.5$

$D = 150 \times \frac{70}{100} = 105$

$E = 150 \times \frac{50}{100} = 75$

Total marks obtained by all students in Chemistry = 120 + 112.5 + 142.5 + 105 + 75

= 555

Total marks in Chemistry for 5 students

= 150 × 5 = 750

Required percent = $\frac{555}{750} \times 100 = 74\%$

134. (d) Aggregate of marks obtained by E

$= 100 \times \frac{60}{100} + 150 \times \frac{50}{100} + 150 \times \frac{65}{100} + 100 \times \frac{50}{100} + 100 \times \frac{70}{100}$

= 60 + 75 + 97.5 + 50 + 70 = 352.5

135. (d) Sales of lenovo computer in 2007 = 90000

Sales of lenovo computer in 2001 = 20000

Increase in sales = 90000 – 20000 = 70,000

Percent increase = $\frac{70,000}{20,000} \times 100 = 350\%$

136. (a) Type of computer sales (in thousands) in all the 7 years

IBM = 50 + 60 + 50 + 40 + 70 + 80 + 100

= 450

Lenovo = 20 + 30 + 50 + 60 + 70 + 80 + 90

= 410

Acer = 40 + 25 + 50 + 70 + 85 + 45 + 60

= 375

HCL = 80 + 70 + 55 + 35 + 25 + 20 + 10

= 295

Hence, maximum sales was for IBM

137. (d) For HCL brand sales has decreased continuosly over the year 2001 to 2007.

138. (c) Percent of Acer computer sold in year

2003 = $\frac{50}{375} \times 100 = 13.33\%$

2004 = $\frac{70}{375} \times 100 = 18.67\%$

2005 = $\frac{85}{375} \times 100 = 22.66\%$ (Maximum)

2007 = $\frac{60}{375} \times 100 = 16\%$

Percent of Acer computer sold is maximum in 2005.

139. (d) Difference in the number of Acer computer sold in 2002 and 2005

= 85,000 – 25,000 = 60,000

140. (b) Total export of all the countries in year 2009

= 40 + 25 + 55 + 60 + 50 + 60 = 270

Total export of all the countries in year 2011

= 45 + 50 + 90 + 15 + 100 + 75 = 375

Percentage increase in export

$$= \left(\frac{375-270}{270}\right)\times 100 = 38\frac{8}{9}\%$$

141. (d) $\dfrac{\text{Export of country F}}{\text{Import of country F}} = \dfrac{4}{1}$

$$\frac{24}{\text{Import of Country F}} = \frac{4}{1}$$

$\therefore$ Import of country $F = \dfrac{24}{4} = 6$ crores.

Similarly,

$$\frac{\text{Export of country D}}{\text{Import of country D}} = \frac{1}{2}$$

$$\frac{45}{\text{Import of country D}} = \frac{1}{2}$$

Import of country $D = 45 \times 2 = 90$ crores

Total import of country F and $D = 6 + 90 = 96$ crores

142. (a) Average export of country E over all the years

$$= \frac{60+50+55+100+110}{5} = \frac{375}{5}$$

= 75 crores

Average export of country C over all the years.

$$= \frac{50+55+70+90+65}{5} = \frac{330}{5} = 66 \text{ crores}$$

$$\text{Required percent} = \left(\frac{75-66}{66}\right)\times 100 = 13\frac{7}{11}\%$$

143. (d) Total export of all the countries together in year 2012

= 90 + 100 + 65 + 25 + 110 + 120

= 510 crores

Total imports of all the countries together in year 2012 = 385 crores

Profit = Export – Import

= 510 – 385 = 125 crores.

144. (c) Total export of country B in 2011 + Export of country E in 2010

= 50 + 55 = 105 crores

Export of country A in 2013 $= 105\times\dfrac{120}{100}$

= 126 crores

Import of country A in 2013 = 92 crores.

Profit = Export – Import

= 126 – 92 = 34 crores.

145. (c) Total marks of Sanya in all the five subject

$$= 15\times\frac{90}{100}+\frac{130\times 60}{100}+120\times\frac{85}{100}+100\times\frac{80}{100}+100\times\frac{60}{100}$$

= 135 + 78 + 102 + 80 + 60 = 455

146. (d) Average percent marks of student in subject Chemistry

$$= \frac{50+60+60+75+80+75}{6} = 66.67\%$$

Physics

$$= \frac{80+70+85+65+70+50}{6} = 70\%$$

Biology

$$= \frac{60+40+80+90+85+80}{6} = 72.5\%$$

English

$$= \frac{70+80+60+90+50+40}{6} = 65\%$$

Hence, performance of the student is worst in English.

147. (b) Sanya and Rahul obtained 60% or above marks in all the subject.

148. (a) Average marks in chemistry

$$\frac{130\times\left(\frac{50}{100}+\frac{60}{100}+\frac{60}{100}+\frac{75}{100}+\frac{80}{100}+\frac{75}{100}\right)}{6}$$

$$= 130\times\frac{400}{600} = 86.67$$

149. (b) Total marks obtained by Amar

$$= 150\times\frac{100}{100}+130\times\frac{60}{100}+120\times\frac{70}{100}+100\times\frac{40}{100}+100\times\frac{80}{100}$$

= 150 + 78 + 84 + 40 + 80 = 432

Total marks of all subject

= 150 + 130 + 120 + 100 + 100 = 600.

$$\text{Overall percentage of marks} = \frac{432}{600}\times 100 = 72\%$$

150. (b) Average production of A-type vechicles from 2012 to 2018

$$= \frac{5000+15000+10000+17500+25000+13000+30000}{7} = \frac{115500}{7} = 16500$$

Now, production of A type vehicle in year 2012, 2013, 2014 and 2017 are 5000, 15000, 10000 and 13000, which is less than 16500.

151. (a) Average production of B type vehicles over the years

$$= \frac{20000+10000+15000+15000+20000+25000+35000}{7} = 20{,}000$$

152. (b) Number of A-type vehicles produced in 2014 = 10,000

Number of C-type vehicles produced in 2016 = 15,000

$$\text{Required percent} = \frac{10{,}000}{15{,}000}\times 100 \approx 66.67\%$$

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153. (a) Production of type B vehicles in
Year 2018 = 35,000 - Highest
Year 2017 = 25,000
Year 2013 = 10,000
Year 2012 = 20,000
Hence, in year 2018, production of type-B vehicles is highest.

154. (d)

Year	Total productions
2013	15000 + 10000 + 22500 = 47500
2014	10000 + 15000 + 30000 = 55000
2015	17500 + 15000 + 23000 = 55500
2016	25000 + 20000 + 15000 = 60000

Hence, in year 2016, total production of all the three vehicles is 60,000.

155. (d) Number of students admitted in college A in year 2015 = 15000
Number of students admitted in college A in year 2016 = 17000
Percentage increase in number
$= \left(\frac{17000-15000}{15000}\right)\times 100 = 13\%$

156. (a) Total number of students admitted in college C
= 11000 + 13000 + 19000 + 23000 + 24000 + 16000
= 1,06,000
Total number of students admitted in all the three colleges together in the year 2017
= 13000 + 27000 + 23000 = 63000
Required percentage $= \frac{106000}{63000}\times 100$
= 168%

157. (b) Total number of students admitted in college A over all the year together
= 8000 + 15000 + 17000 + 13000 + 22000 + 27000
= 1,02,000
Total number of students admitted in college C in the year 2018 and 2019 together
= 24000 + 16000 = 40000
Difference in number = 102000 – 40000
= 62,000

158. (a) Average number of students
$= \frac{15000+23000+16000}{3} = 18000$

159. (c) In College C, number of students admitted in year 2016 was second lowest. It was maximum in college B and minimum in college A, in college A, number of students admitted in year 2018 was minimum. It was second lowest in college C and maximum in college B.

160. (c) Profit $= \left(\frac{\text{Income} - \text{Expenditure}}{\text{Expenditure}}\right)\times 100$

In year 2013, $20 = \left[\frac{\text{Income}}{\text{Expenditure}} - 1\right]$

$\therefore \frac{\text{Income}}{\text{Expenditure}} = 20 + 1 = 21$

In year 2015 $= \frac{\text{Income}}{\text{Expenditure}} = 40 + 1 = 41$ (Maximum)

In year 2017 $= \frac{\text{Income}}{\text{Expenditure}} = 30 + 1 = 31$

In year 2018 $= \frac{\text{Income}}{\text{Expenditure}} = 15 + 1 = 16$

Hence, the ratio is maximum in year 2015.

161. (a) Sum of expenditure of company *B* in year 2014 and 2017 = 48 lakhs.
Percent of profit of company *B* in year 2014 and 2017 is 30% each
Let expenditure of company *B* in year 2014 and 2017 are x and $(48 - x)$ respectively
So, Income
$= x\times\left(1+\frac{30}{100}\right)+(48-x)\times\left(1+\frac{30}{100}\right)$
$= 1.3x + (48 - x) \times 1.3 = 1.3 \times (48)$
$= 1.3 \times 48 \approx 62.4$ lakhs.

162. (a) Expenditure of company *B* in year 2013
= 17 lakhs
Profit% = 35%
Then $35 = \left[\frac{\text{Income} - \text{Expenditure}}{\text{Expenditure}}\right]\times 100$

$35 = \left[\frac{\text{Income} - 17}{17}\right]\times 100$

$\therefore$ Income $= \left[\frac{35\times 17}{100}\right] + 17 = 22.95$ lakhs.

163. (b) Income of company B in 2018 = 77 lakhs
Profit % = 40%

Now, $40 = \left[\frac{77 - \text{Expenditure}}{\text{Expenditure}}\right]\times 100$

So, expenditure $= \frac{77\times 1}{1.4} = 55$ lakhs

$\therefore$ Expenditure of company *A* in 2013 = 55 lakhs
Now, profit % = 20%
$\therefore$ Income of company *A* in 2013

$= 55\times\left(1+\frac{20}{100}\right) = 55 \times 1.2 = 66$ lakhs

164. (d) Income of company *A* in 2017 = 26 lakhs
Profit % = 30%

$$\text{Expenditure} = \text{Income} \times \left(\frac{100}{100 + \text{ profit \%}}\right)$$

$$= 26 \times \frac{100}{(100+30)} = 26 \times \frac{100}{130} = 20 \text{ lakhs.}$$

165. (a) Average annual exports from company A

$$= \frac{40+70+50+80+110+60+130}{7}$$

$$= \frac{540}{7} = 80$$

Export from company A in year 2016 and 2018 are ₹110 and ₹130 crores respectively which is greater them the average export by company A.

166. (c) Absolute difference between exports from companies A and B in
Year 2013 = 70 – 50 = ₹20 crores
Year 2014 = 70 – 50 = ₹20 crores
Year 2015 = 80 – 70 = ₹10 crores – Minimum
Year 2016 = 110 – 90 = ₹20 crores
This is minimum is year 2015.

167. (d) Average export of three companies in year 2017

$$= \frac{60+110+90}{3} = ₹86.67 \text{ crores}$$

Average export of three companies in year 2012

$$= \frac{40+90+70}{3} = ₹66.67 \text{ crores}$$

Difference between the average exports of three companies
= 86.67 – 66.67 = ₹20 crores.

168. (d) Total exports from the three companies A, B and C in
Year 2014 = 50 + 70 + 130 = ₹250 crores
Year 2015 = 80 + 70 + 100 = ₹250 crores
Year 2016 = 110 + 90 + 70 = ₹270 crores
Year 2017 = 60 + 110 + 90 = ₹260 crores
Thus total exports from three companies A, B and C are equal in year 2014 and 2015.

169. (c) Average annual exports for company B

$$= \frac{90+50+70+70+90+110+150}{7}$$

$$= \frac{630}{7} = ₹90 \text{ crores}$$

Average annual exports for company C

$$= \frac{70+100+130+100+70+90+110}{7}$$

$$= \frac{670}{7} = ₹95.714 \text{ crores}$$

$$\text{Required percent} = \frac{90}{95.714} \times 100 = 94\%$$

170. (a) Expenditure of company A in year 2017 = 45 lakhs
% Profit of A in 2017 = 10%

$$\text{Profit of company A in year 2017} = 45 \times \frac{10}{100} = 4.5 \text{ lakhs}$$

Profit of company B in year 2017 = 80 – 50 = 30 lakhs

$$\text{Required percent} = \frac{4.5}{30} \times 100 = 15\%$$

171. (d) Income of company A in year 2014 = 32.5 lakhs

$$\text{Profit of company A in year 2014} = 32.5 \times \frac{100}{(100+25)}$$

$$= 32.5 \times \frac{100}{125} = 26 \text{ lakhs}$$

Net Profit of company A in year 2014
= 32.5 – 26 = 6.5 lakhs
Net Profit of company B in year 2014
= 35 – 25 = 10 lakhs
Sum of profits of company A and B together in year 2014 = 6.5 + 10 = 16.5 lakhs

172. (c) % Profit of company B in :

$$\text{Year 2013} = \left(\frac{48.6-36}{36}\right) \times 100 = 35\%$$

$$\text{Year 2014} = \left(\frac{35-25}{25}\right) \times 100 = 40\%$$

$$\text{Year 2015} = \left(\frac{62.4-48}{48}\right) \times 100 = 30\%$$

$$\text{Year 2016} = \left(\frac{77-40}{40}\right) \times 100 = 92.5\% \quad \text{(Maximum)}$$

$$\text{Year 2017} = \left(\frac{80-50}{50}\right) \times 100 = 60\%$$

$$\text{Year 2018} = \left(\frac{72-45}{45}\right) \times 100 = 60\%$$

$\therefore$ Percent profit of company B is maximum in the year 2016.

173. (d) Income of company A in year 2018 = 90 lakhs
Expenditure of company A in year 2018

$$= 90 \times \frac{100}{(100+20)} = 90 \times \frac{5}{6} = 75 \text{ lakhs}$$

Net profit of company A in 2018
= 90 – 75 = 15 lakhs
Net profit of company B in 2018 = 72 – 45 = 27 lakhs
Difference in profit = 27 – 15 = 12 lakhs

$$\text{Required percent} = \frac{12}{15} \times 100 = 80\%$$

174. (a) Percent profit of company B in 2013

$$= \left(\frac{48.6-36}{36}\right) \times 100 = 35\%$$

Percent profit of company A in 2013 = 40%
Difference in percent profit = 40% – 35% = 5%

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CHAPTER 32

Data and Governance

Data Governance is a system of decision rights and accountabilities for information-related processes, executed according to agreed-upon models which describe who can take what actions with what information, and when, under what circumstances, using what methods.

- Data governance is primarily used to refer to the strategy of managing and controlling data.
- Data governance is the overall management of data availability, relevancy, usability, integrity and security
- The drivers of data governance are ususally regulatory and legal requirements; however, a governance rule can be any practice to which the organization wishes to adhere.
- Governance often dictates where certain types of data may be stored and codifies data protection methods, such as encryption or password strength.
- Governance can dictate how to back up data, who has access to data, and when archived data should be destroyed.

The committee identified seven key principles for the data protection law:

- Technology agnostics
- Holistic application
- Informed consent
- Data minimization
- Controller accountability
- Structured enforcement
- Deterrent penalties
- Protection of sensitive personal data

It envisions three main objectives of a data protection authority: monitor, investigate and enforce the laws: set the standards and generate awareness in an increasingly digitized society.

EXERCISE

1. The number of students in four classes A, B, C, D and their respective mean marks obtained by each of the class are given below: **[December-2006]**

	Class A	Class B	Class C	Class D
Number of students	10	40	30	20
Arithmetic mean	20	30	50	15

The combined mean of the marks of four classes together will be:

(a) 32 (b) 50
(c) 20 (d) 15

2. Which one of the following is the most comprehensive source of population data? **[June-2008]**
(a) National Family Health Surveys
(b) National Sample Surveys
(c) Census
(d) Demographic Health Surveys

3. Which one of the following methods serve to measure correlation between two variables ? **[December-2010]**
(a) Scatter Diagram
(b) Frequency Distribution
(c) Two-way table
(d) Coefficient of Rank Correlation

4. Which one of the following does not come under the methods of data classification? **[June-2011]**
(a) Qualitative (b) Normative
(c) Spatial (d) Quantitative

5. Which one of the following is not a source of data ? **[June-2011]**
(a) Administrative records (b) Population census
(c) GIS (d) Sample survey

DIRECTIONS (Qs. 6-11): On the basis of the data given in the following table, give answers to the questions.

Government Expenditures on Social Services
(As percent of total expenditure)

Sl. No.	Items	2007-08	2008-09	2009-10	2010-11
	Social Services	11.06	12.94	13.06	14.02
(a)	Education, sports & youth affairs	4.02	4.04	3.96	4.46
(b)	Health & family welfare	2.05	1.91	1.90	2.03

(c)	Water supply, housing, etc.	2.02	2.31	2.20	2.27
(d)	Information & broadcasting	0.22	0.22	0.20	0.22
(e)	Welfare to SC/ST & OBC	0.36	0.35	0.41	0.63
(f)	Labour and employment	0.27	0.27	0.22	0.25
(g)	Social welfare & nutrition	0.82	0.72	0.79	1.06
(h)	North-eastern areas	0.00	1.56	1.50	1.75
(i)	Other social services	1.29	1.55	1.87	1.34
	Total Government expenditure	100.00	100.00	100.00	100.00

[December-2012]

6. How many activities in the social services are there where the expenditure has been less than 5 percent of the total expenditures incurred on the social services in 2008-09 ?
(a) One (b) Three
(c) Five (d) All the above

7. In which year, the expenditures on the social services have increased at the highest rate ?
(a) 2007-08 (b) 2008-09
(c) 2009-10 (d) 2010-11

8. Which of the following activities remains almost stagnant in terms of share of expenditures?
(a) North-eastern areas
(b) Welfare to SC/ST & OBC
(c) Information & broadcasting
(d) Social welfare and nutrition

9. Which of the following item's expenditure share is almost equal to sum of the remaining three items in the given years ?
(a) Information & broadcasting
(b) Welfare to SC/ST and OBC
(c) Labour and employment
(d) Social welfare & nutrition

10. Which of the following items of social services has registered the highest rate of increase in expenditures during 2007-08 to 2010-11 ?
(a) Education, sports & youth affairs
(b) Welfare to SC/ST & OBC
(c) Information & broadcasting
(d) Overall social services

11. Which of the following items has registered the highest rate of decline in terms of expenditure during 2007-08 to 2009-10 ?
(a) Labour and employment
(b) Health & family welfare
(c) Social welfare & nutrition
(d) Education, sports & youth affairs

HINTS & EXPLANATION

1. (a) Mean of the marks

$$= \frac{10\times 20 + 40\times 30 + 30\times 50 + 20\times 15}{10+40+30+20}$$

$$= \frac{200+1200+1500+300}{100}$$

$$= \frac{3200}{100} = 32$$

2. (c) The simplest and most comprehensive (though arguably not the most accurate or effective) way to enumerate the population is to count every single person. Such a Herculean collection of data, called Census, is usually carried out by the government through interviews and surveys. No estimation is done in it.

National Family Health Surveys are conducted in a representative sample of households; National Sample Surveys collect household sample data; Demographic Health Surveys collect nationally representative data on health and population for monitoring, and impact evaluation indicators in the areas of population, health, and nutrition.

3. (d) Coefficient of rank correlation.

Correlation test is used to evaluate the association between two or more variables.

Scatter diagram is a graph in which the values of two variables are plotted along two axes, the pattern of the resulting points revealing any correlation present.

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Frequency distribution is a mathematical function showing the number of instances in which a variable takes each of its possible values.

A **two-way table** (also called a contingency table) is a useful tool for examining relationships between categorical variables. The entries in the cells of a two-way table can be frequency counts or relative frequencies.

A rank correlation is any of several statistics that measure an ordinal association—the relationship between rankings of different ordinal variables or different rankings of the same variable. A **rank correlation coefficient** measures the degree of similarity between two rankings, and can be used to assess the significance of the relation between them.

4. (c) Data classification is the process of organizing data into categories for its most effective and efficient use. A well-planned data classification system makes essential data easy to find and retrieve. This can be of particular importance for risk management, legal discovery, and compliance. Qualitative, Normative and Quantitative methods come under the methods of data classification.

5. (d) A sample survey is a process for collecting data on a sample of observations which are selected from the population of interest using a probability-based sample design. In sample surveys, certain methods are often used to improve the precision and control the costs of survey data collection.

6. (b)

7. (b) Growth rate in 2008-09

$$= \frac{12\cdot94-11\cdot06}{11\cdot06}\times100\%$$

$$= \frac{1\cdot88}{11\cdot06}\times100\% = 16.99\%$$

Growth rate in 2009-10 $= \frac{13\cdot06-12\cdot94}{12\cdot94}\times100\%$

$$= \frac{0\cdot12}{12\cdot94}\times100\%$$

$$= 0.927\%$$

Growth rate in 2010-11 $= \frac{14\cdot02-13\cdot06}{13\cdot06}\times100\%$

$$= \frac{0\cdot96}{13\cdot06}\times100\%$$

$$= 7\cdot350\%$$

8. (c) The shares of expenditure for Information and Broadcasting has been 0.22, 0.22, 0.20 and 0.22 for 2007-08, 2008-09 2009-10 & 2010-11 respectively. It has almost remained stagnant.

9. (d) For all years share of Social welfare & nutrition is roughly equal to sum of shares of Information & Broadcasting, welfare to SC/ST & OBC and Labour and employment.

10. (b) Education sports & youth affairs

$$= \frac{4.46-4.02}{4.02}\times100 = 10.94\%$$

Welfare to SC/ST & OBC

$$= \frac{0.63-0.36}{0.36}\times100 = 75\%$$

Social welfare and nutrition

$$= \frac{1.06-0.82}{0.82}\times100 = 29.26\%$$

Overall Social services

$$= \frac{14.02-11.06}{11.06}\times100 = 26.76\%$$

Welfare to SC/ST & OBC has the highest growth rate from 2007-08, to 2010-11

11. (a) Labour and employment

$$= \frac{0.22-0.27}{0.27}\times100 = -18.5\%$$

Health and family welfare

$$= \frac{1.90-2.05}{2.05}\times100 = -7.31\%$$

Social welfare and nutrition

$$= \frac{0.79-0.82}{0.82}\times100 = -3.65\%$$

Education, Sports & youth affairs

$$= \frac{3.96-4.02}{4.02}\times100 = -1.492\%$$

Labour and employment has the maximum decline from 2007-08 to 2009-10.

CHAPTER 33

Information and Communication Technology (ICT)

ICT is an umbrella term that includes any communication device or application, encompassing radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning.

ICT often finds application in education, health care, library and many other fields contexts.

GENERAL ABBREVIATIONS RELATED TO ICT

ASCII	American Standard Code for Information Interchange
AI	Artificial Intelligence
ALU	Arithmetic and Logic Unit
ALGOL	Algorithmic Language
ASCII	American Standard Code for Information Interchange
ATX	Advanced Technology Extended
BASIC	Beginner All Purpose Symbolic Instruction Code
BCC	Blind Carbon Copy
BIOS	Basic Input and Output System
BINAC	Binary Automatic Computer
CAN	Campus Area Network
CAD	Computer Aid Design
CC	Carbon Copy (on emails)
CCNP	Cisco Certified Network Professionals
CD	Compact Disk
CDROM	Compact Disc Read Only Memory
CEH	Certified Ethical Hacking
CISCO	Computer Information System Company
CMD	Command
COBOL	Common Basic Oriented Language
CSS	Cascading Style Sheet
CPU	Central Processing Unit
CMOS	Complimentary Metaoxide Semi Conductor
CCNA	Cisco Certified Network Associate
DBA	Database Admin
DBMS	Database Management System
DDOS	Distribution Denial Of Service
DIMMs	Dual In-line Memory Module
DOC	Document
DNS	Domain Name System
DVD	Digital Versatile Disc
EBCDIC	Extended Binary Coded Decimal Interchange Code
EDSAC	Electronic Dialog Storage Automatic Computer
e-Commerce	Electronic Commerce
EEPROM/ EAPROM	Electrical Erasable/Alterable Programmable Read Only Memory
ENIAC	Electronic Number Integrator and Calculator
EPROM	Erasable Programmable Read only Memory
EXE	Executable
FAX	Far Away Xerox
FORTRAN	Formular Translator
FS	File System
FTP	File Transfer Protocols
GB	Gigabyte
GIF	Graphics Interchange Format
GSM	Global System for Mobile Communication
GIGO	Gabbage In Gabbage Out
GUI	Graphic User Interface
HTML	Hypertext Markup Language
HTTP	Hypertext Transfer Protocol
HDD	Hard Disk Drive
GHZ	Gigahertz
ICT	Information Communication Technology
IC	Integrated Circuit
IP	Internet Protocol
IDE	Integrated Drive Electronics
ISP	Internet Service Provider
IMAP	Internet Message Access Protocol
JPEG	Joint Photographic Experts Group

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KB	Kilobyte
LED	Light Emitting Diode
LAN	Local Area Network
LSIC	Large Scale Integrated Circuit
MAC	Media Access Control
MAN	Metropolitan Area Network
MB	Megabyte
MMS	Multimedia Message Service
MHZ	Megahertz
MOS	Metaoxide Semi Conductor
MPEG	Moving Picture Experts Group
MIPS	Million Instructions Per Second
MICR	Magnetic Ink Character Read
NOS	Network Operating System
OS	Operating System
PAN	Personal Area Network
PC	Personal Computer
PCI	Peripheral Component Interconnect
PROM	Programmable Read Only Memory
PDA	Personal Digital Assistant
PDF	Portable Document Format
PDT	Parallel Data Transmission
PHP	PHP Hypertext Preprocessor
PPP	Point to Point Protocols
PING	Packet Internet Gopher
RAM	Random Access Memory
RDBMS	Relational Data Base Management System
RAM	Random Access Memory
RW	Re-Writeable
ROM	Read Only Memory

RIP	Routing Information Protocol
RFI	Remote File Inclusion
SDT	Serial Data Transmission
SEO	Search Engine Optimization
SIM	Subscriber Identification Module
SIMMs	Single In-line Memory Module
SQL	Structured Query Language
SRAM	Static Random Access Memory
SMTP	Simple Mail Transfer Protocol
TB	Terabytes
TCP	Transmission Control Protocol
TCPIP	Transmission Control Protocol Internet Protocol
UNIVAC	Universal Automatic Computer
USSD	Unstructured Supplementary Service Data
URL	Uniform Resource Locator
URI	Uniform Resource Identifier
USB	Universal Serial Bus
VDU	Visual Display Unit
VGA	Visual Graphic Adaptor/ Video Graphics Array
VPN	Virtual Private Network
WAN	Wide Area Network
WiFi	Wireless Fidelity
WPA	Wi-Fi Protected Access
WORM	Write Once Read Many
WLAN	Wireless Local Area Network
WWW	World Wide Web
XML	Extensible Mark-up Language
XXS	Cross Site Scripting
ZB	Zettabyte

TERMINOLOGY RELATED TO ICT

CMS	• 'Content Management System' is the collection of procedures used to manage work flow in a collaborative environment. • In a CMS, data can be defined as nearly anything: documents, movies, pictures, phone numbers, scientific data, and so forth. • CMSs are frequently used for storing, controlling, revising, semantically enriching, and publishing documentation. • Serving as a central repository, the CMS increases the version level of new updates to an already existing file. • Version control is one of the primary advantages of a CMS.
Cookie	• A small piece of information you may be asked to accept when connecting to certain servers via a web browser. • It is used throughout your session as a means of identifying you. • A cookie is specific to, and sent only to the server that generated it.
Cyberspace	• A term describing the world of computers and the society that uses them

Data as a Service (DaaS)	• Data as a Service (DaaS) is defined as any service offered wherein users can access vendor provided databases or host their own databases on vendor managed systems.
	• DaaS is expected to grow significantly in the near future due to a few dominant themes including cloud-based infrastructure/services, enterprise data syndication, and the consumer services trend towards everything as a Service (XaaS). • In addition, vendor managed systems provide necessary scalability and security for sustainable services execution. • The DaaS market is expected to continue to expand alongside the Cloud Computing services model over the next decade. Telecom Data as a Service (TDaaS) is one of those new models in which CSPs offer DaaS to various third-party businesses on an anonymized basis. • IoT Data as a Service (IoTDaaS) offers convenient and cost effective solutions to enterprises of various sizes and domain. • IoT DaaS constitutes retrieving, storing and analyzing information and provide customer either of the three or integrated service package depending on the budget and the requirement.
Database	• A collection of information organized so that a computer application can quickly access selected information; it can be thought of as an electronic filing system. Traditional databases are organized by fields, records (a complete set of fields), and files (a collection of records). • Alternatively, in a Hypertext database, any object (e.g., text, a picture, or a film) can be linked to any other object.
Data center	• A data center is a facility used to house computer systems and associated components, such as telecommunications and storage systems. • It generally includes redundant or backup power supplies, redundant data communications connections, environmental controls (e.g., air conditioning, fire suppression) and security devices.
Data Management	• Managing ICT data takes many shapes and forms. Specialized technologies, tools, and techniques (referred to collectively as Big Data Analytics) are utilized to deal with unstructured data (e.g. data that is non-correlated and/or of sufficient size and scope to be unwieldy to manage with conventional data management tools). • Leveraging analytics tools to derive value and the integration between cloud, IoT, and enterprise operational technology are key focus areas for large companies across virtually every industry vertical. • This is important for many industry verticals and market segments. • For example, Smart Cities will rely upon IoT data management and analytics to provide control, automation, and enable better decision making.
Decompress	• Opposite of compressing a file; the process of restoring the file to its original size and format. • The most common programs for decompressing files are Winrar for PC and compatible computers (.zip files) and Stuffit Expander (.sit files) for Macintosh computers.
Defragmentation	• The process of rewriting parts of a file to contiguous sectors on a hard drive to increase the speed of access and retrieval.
DHCP	• Dynamic Host Configuration Protocol; a protocol that lets a server on a local network assign temporary IP addresses to a computer or other network devices.
DIMM	• Dual In-line Memory Module; a small circuit board that can hold a group of memory chips. • A DIMM is capable of transferring 64 bits instead of the 32 bits each SIMM can handle.
DPI	• Dots per inch; a measure of a printer's resolution. The higher the number, the better the print quality. • A minimum of 300 dpi usually is required for professional quality printing.
Edge Computing	• There is an evolution underway in which edge computing is gaining prominence in ICT networks. • Decentralized or distributed (e.g. Fog) cloud computing will become increasingly important as various wireless and Internet of Things (IoT) related applications require massive computing at the edge of networks. • Mobile cellular operators are making plans for Mobile Edge Computing (MEC), which enables cloud computing capabilities and an IT service environment at the edge of the cellular network. • MEC will enable many new and enhanced applications and services including improvements in Augmented Reality, Location-based Services, Enterprise-specific Context Aware Services, Real-time Data as a Service (DaaS), and more.
EGA	• Extended Graphics Adapter; a card (or board) usually found in older PCs that enables the monitor to display 640 pixels horizontally and 350 vertically.

Emulation	• Refers to the ability of a program or device to imitate another program or device; communications software often include terminal emulation drivers to enable you to log on to a mainframe. • There also are programs that enable a Mac to function as a PC.
Encryption	• The manipulation of data to prevent accurate interpretation by all but those for whom the data is intended.
Ethernet	• A popular network technology that enables data to travel at 10 megabits per second. • Campus microcomputers connected to a network have Ethernet cards installed that are attached to Ethernet cabling. • An Ethernet connection is often referred to as a "direct connection" and is capable of providing data transmission speeds over 500 Kbps.
Extension	• A suffix proceeded by a period at the end of a filename; used to describe the file type. Example: On a Windows computer, the extension ".exe" represents an executable file.
File	• A collection of data that has a name (called the filename). • Almost all information on a computer is stored in some type of file. Examples: data file (contains data such as a group of records); executable file (contains a program or commands that are executable); text file (contains data that can be read using a standard text editor).
Firewall	• A method of preventing unauthorized access to or from a particular network; firewalls can be implemented in both hardware and software, or both.
Freeware	• Copyrighted software available for downloading without charge; unlimited personal usage is permitted, but you cannot do anything else without express permission of the author.
	• Contrast to shareware; copyrighted software which requires you to register and pay a small fee to the author if you decide to continue using a program you download.
Fragmentation	• The scattering of parts of the same disk file over different areas of a disk; fragmentation occurs as files are deleted and new ones are added.
FTP	• File Transfer Protocol; a method of exchanging files between computers via the Internet. A program like WS_FTP for IBM PC or compatibles or Fetch for Macintosh is required. • Files can contain documents or programs and can be ASCII text or binary data.
GIF	• Graphics Interchange Format; a format for a file that contains a graphic or a picture. • Files of this type usually have the suffix ".gif" as part of their name. Many images seen on web pages are GIF files.
GPS	• Global Positioning System; a collection of Earth-orbiting satellites. • In a more common context, GPS actually refers to a GPS receiver which uses a mathematical principle called "trilateration" that can tell you exactly where you are on Earth at any moment.
Greyware	• Greyware (or grayware) refers to a malicious software or code that is considered to fall in the "grey area" between normal software and a virus. • Greyware is a term for which all other malicious or annoying software such as adware, spyware, trackware, and other malicious code and malicious shareware fall under.
GUI	• Graphical user interface; a mouse-based system that contains icons, drop-down menus, and windows where you point and click to indicate what you want to do.
Haptic Internet	• Most people are familiar with Haptic technology by way of the kinesthetic user interface for smart phones or other consumer electronics that recreates a sense of touch by applying forces, vibrations, or motions to the user. • Conversely, haptic devices may incorporate tactile sensors that measure forces exerted by the user on the interface. • Tactile Internet will be based on haptic sense/ touch that will connect humans with unknown environments. • Haptic sense establishes bilateral communication patterns as touch imposes sensed motion on environment that enables environment to create a distortion or reaction and feel.
High-Definition Multimedia Interface (HDMI)	• Short for High-Definition Multimedia Interface, it is the first industry-supported uncompressed, all-digital audio/video proprietary interface. • It is a single cable and user-friendly connector that replaces the maze of cabling behind the home entertainment center.

	• An HDMI cable provides an interface between any audio/video source, such as a set-top box, DVD player, or A/V receiver and an audio and/or video monitor, such as a digital television (DTV), over a single cable. HDMI supports standard, enhanced, or high-definition video, plus multi-channel digital audio on a single cable.
Heterogeneous Networks (HetNet)	• Wireless networks need to handle an ever increasing number of devices, consuming high volumes of data, both indoors and outdoors, and in a very unpredictable pattern with seamless coverage and consistent capacity. • A Heterogeneous Network (HetNet) is comprised of a combination of cellular Macro Cells, Small Cells, Carrier WiFi and supporting technologies to meet the coverage and usage demands of both humans and machines (associated with IoT apps and services). • In a HetNet environment, the Macro Cell provides a larger umbrella coverage area while Small Cells are placed in strategically closer locations to the UE to provide required coverage and capacity. • HetNets are critical infrastructure for the success of LTE and for the development of future 5G based networks.
HTML	• HyperText Markup Language; a language used for creating web pages. Various instructions and sets of tags are used to define how the document will look.
Hyperlink	• Connects one piece of information (anchor) to a related piece of information (anchor) in an electronic document. Clicking on a hyperlink takes you to directly to the linked destination which can be within the same document or in an entirely different document. Hyperlinks are commonly found on web pages, word documents and PDF files.
Hypertext	• Data that contains one or more links to other data; commonly seen in web pages and in online help files. • Key words usually are underlined or highlighted. • In a hypertext file, you click on a link to go directly to the related information.
IMAP	• Internet Message Access Protcol. A method of accessing e-mail messages on a server without downloading them to your local hard drive; it is the main difference between IMAP and POP3 which requires messages to be downloaded to a user's hard drive before the message can be read.
Industrial Internet of Things	• The term Industrial Internet or Industrial Internet of Things (IIoT) is sometimes used in the context of next generation manufacturing, but it may also be referenced in a more general sense to pertain to the broader enterprise market, which includes many different industry verticals such as IoT in Agriculture. • In both cases, IIoT benefits will extend beyond initial cost savings and process improvements to identification of entirely new business models and service offerings as traditional products transform to services.
Intelligent Network (IN)	• The term Intelligent Network is typically reserved for reference to telecommunication standards and technologies associated with centralized control application control and services management. • IN standards in cellular networks include Customized Applications for Mobile Enhanced Logic (CAMEL) for GSM networks and Wireless Intelligent Network (WIN) for ANSI networks.
Internet of Things	• The Internet of Things (IoT) refers to uniquely identifiable objects (things) and their virtual representations in an Internet-like structure. • Stated differently, the concept involves the notion that there are many things (assets, objects, etc.) in the world that may be addressed/labeled/cataloged for various purposes.
IP Multimedia Subsystem (IMS)	• The IP Multimedia Subsystem (IMS) is an architecture for delivering Internet Protocol (IP) based multimedia services with quality of service over multiple access networks from a common core. • It was initiated in mobile standards body 3rd Generation Partnership Project (3GPP), as a part of the vision for evolving mobile networks. • The original vision was the delivery of internet services over GPRS (General Packet Radio System). • That vision was subsequently updated by 3GPP, 3GPP2, Cable Labs and TISPAN (Telecommunications and Internet Services and Protocols for Advanced Networks) to support multiple access networks.
JPEG	• Joint Photographic Experts Group; a graphics format which compresses an image to save space. • Most images imbedded in web pages are GIFs, but sometimes the JPEG format is used (especially for detailed graphics or photographs). • In some cases, you can click on the image to display a larger version with better resolution.

Kbps	• Kilobits per second; a measure of data transfer speed; one Kbps is 1,000 bits per second. Example: a 28.8 Kbps modem.
Kerning	• The amount of space between characters in a word; in desktop publishing, it is typically performed on pairs of letters or on a short range of text to fine-tune the character spacing.
Learning management system (LMS)	• Software used for developing, using, and storing course content of all types. Information within a learning management system often takes the form of learning objects.
List Processor	• A program that manages electronic mailing lists; OIT is responsible for the List Processor software and also handles requests from the OSU community or new mailing lists.
Machine Learning	• An application of Artificial Intelligence that gives machines the ability to learn and improve without the help of humans or new programming.
MAC	• Media Access Control; The hardware address of a device connected to a shared network.
Mainframe	• A very large computer capable of supporting hundreds of users running a variety of different programs simultaneously. • Often the distinction between small mainframes and minicomputers is vague and may depend on how the machine is marketed.
Malware	• Software programs designed to damage or do other unwanted actions on a computer; common examples of malware include viruses, worms, trojan horses, and spyware.
MAPI	• Messaging Application Programming Interface; a system built into Microsoft Windows that enables different e-mail programs to interface to distribute e-mail. • When both programs are MAPI-enabled, they can share messages.
MDM	• Mobile Device Management; Any routine or tool intended to distribute applications, data, and configuration settings to mobile communications devices. • The intent of MDM is to optimize the functionality and security of a mobile communications network. MDM must be part of a coherent BYOD strategy.
MIME	• Multipurpose Internet Mail Extensions; a protocol that enables you to include various types of files (text, audio, video, images, etc.) as an attachment to an e-mail message.
MPEG	• Motion Picture Experts Group; a high quality video format commonly used for files found on the Internet. Usually a special helper application is required to view MPEG files.
MRB	• Managed Remote Back Up; a service that provides users with a system for the backup, storage, and recovery of data using cloud computing.
MSP	• Managed Service Provider; A business model for providing information-technology services.
Multimedia	• The delivery of information, usually to a personal computer, in a combination of different formats including text, graphics, animation, audio, and video.
Multitasking	• The ability of a CPU to perform more than one operation at the same time; Windows and Macintosh computers are multitasking in that each program that is running uses the CPU only for as long as needed and then control switches to the next task.
NaaS	• Network as a Service; a category of cloud services that provides users with the capability of where the capability provided to the cloud service user is to using network/transport connectivity services and/or inter-cloud network connectivity services.
NAT	• Network Address Translation; a standard that enables a LAN to use a set of IP addresses for internal traffic and a single IP address for communications with the Internet.
NNTP	• Network News Transport Protocol; the protocol used for posting, distributing, and retrieving network news messages.
Network monitoring:	• Dataprise Cloud-based Network Monitoring service, can configure and remotely monitor all of your important network systems (e-mail, servers, routers, available disk space, backup applications, critical virus detection, and more). • If our system detects a problem, it alerts the Dataprise Technical Support Center, so we can take corrective action. • Depending on prearranged instructions from your own network engineers, we'll correct the problem immediately, wait until the next business day or simply notify you of the issue.

Network security	• Network security consists of the provisions and policies adopted by a network administrator to prevent and monitor unauthorized access, misuse, modification, or denial of the computer network and network-accessible resources. • Network Security is the authorization of access to data in a network, which is controlled by a network administrator. • Dataprise uses state-of-the-art network security techniques while providing authorized personnel access to important files and applications. • Every organization's needs are different and hackers are always adapting their techniques, so we are extremely serious about staying up to date with the latest network security tools, threats and industry developments.
OCR	• Optical character recognition; the act of using a visual scanning device to read text from hard copy and translate it into a format a computer can access (e.g., an ASCII file). • OCR systems include an optical scanner for reading text and sophisticated software for analyzing images.
PaaS	• Platform as a Service, in the PaaS model, cloud providers deliver a computing platform that typically including an operating system, programming language execution environment, database, and web server.
Palette	• The range of colors a computer or an application is able to display. Most new computers can display as many as 16 million colors, but a given program may use only 256 of them. • Also refers to a display box containing a set of related tools within a desktop publishing or graphics design program.
Packet	• A form of switching in which data is transmitted as packets of information that are "bursty" in nature a usually transmitted over diverse routes.
peer-to-peer	• A type of connection between two computers; both perform computations, store data, and make requests from each other (unlike a client-server connection where one computer makes a request and the other computer responds with information).
phishing	• A con that scammers use to electronically collect personal information from unsuspecting users. • Phishers send e-mails that appear to come from legitimate websites such as eBay, PayPal, or other banking institutions asking you to click on a link included in the email and then update or validate your information by entering your username and password and often even more information, such as your full name, address, phone number, social security number, and credit card number.
PING	• Packet Internet Groper; a utility used to determine whether a particular computer is currently connected to the Internet. • It works by sending a packet to the specified IP address and waiting for a reply.
Pixel	• Stands for one picture element (one dot on a computer monitor); commonly used as a unit of measurement.
plug-in	• A program used for viewing multimedia files that your web browser cannot handle internally; files using a plug-in do not need to be moved to your computer before being shown or played. • Contrast to a helper application which requires the file to first be moved to your computer. Examples of plug-ins: Adobe Flash Player (for video and animation) and Quicktime (for streamed files over the Internet).
Plug and play	• A set of specifications that allows a computer to automatically detect and configure a device and install the appropriate device drivers.
POP	• Post Office Protocol; a method of handling incoming electronic mail. Example: E-mail programs may use this protocol for storing your incoming messages on a special cluster of servers called pop. service.
PostScript	• A page description language primarily used for printing documents on laser printers; it is the standard for desktop publishing because it takes advantage of high resolution output devices. Example: A graphic design saved in PostScript format looks much better when printed on a 600 dpi printer than on a 300 dpi printer.
Proxy	• Refers to a special kind of server that functions as an intermediate link between a client application (like a web browser) and a real server. • The proxy server intercepts requests for information from the real server and whenever possible, fills the request. • When it is unable to do so, the request is forwarded to the real server.

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Public domain software	• Any non-copyrighted program; this software is free and can be used without restriction. Often confused with "freeware" (free software that is copyrighted by the author).
Plain Old Telephone Service (POTS)	• Often used to refer to the most basic legacy features, such as "dial tone" and the ability to simply initiate and receive calls, POTS is occasionally used to conversely refer to telecommunications services that do not rely upon advanced features or technologies such as use of Internet Protocols or next generation ICT infrastructure.
Programmable Telecom	• The term Programmable Telecom (or Programmable Telecoms) is an important one as it pertains to the general notion of leveraging telecommunications capabilities by way of Telecom APIs as well as other tools including SDKs, GUIs, open source platforms, and other methods.
Public Switched Telecommunications Network (PSTN)	• Generally referred to as the core telecommunications network relied upon for local wireline communications as well as transport of long distance calls and other traditional services. • In contrast, cellular systems are typically not considered part of the PSTN, but rather interconnect with it so that wire line callers can reach wireless users and vice versa. • Likewise, next generation packet-based networks that utilize Internet Protocol based signaling and data transfer are also not considered part of the PSTN.
RTF	• Rich Text Format; a type of document formatting that enables special characteristics like fonts and margins to be included within an ASCII file. • May be used when a document must be shared among users with different kinds of computers (e.g., IBM PC or compatibles and Macintoshes).
SAN	• A storage area network (SAN) is a dedicated storage network that provides access to consolidated, block level storage. • SANs primarily are used to make storage devices (such as disk arrays, tape libraries, and optical jukeboxes) accessible to servers so that the devices appear as locally attached to the operating system. • A SAN typically has its own network of storage devices that are generally not accessible through the regular network by regular devices.
Scroll bar	• In a graphical user interface system, the narrow rectangular bar at the far right of windows or dialog boxes. • Clicking on the up or down arrow enables you to move up and down through a document; a movable square indicates your location in the document. • Certain applications also feature a scroll bar along the bottom of a window that can be used to move from side-to-side.
Self-organizing Networks (SON)	• The concept of Self organizing networks (SON) has picked up only after the transition from 3G to 4G started. This was because of the exponential increase in the data traffic which required a change in the way the network coverage and capacity were planned. • Huge volumes of data traffic clogged up the network while not leading to proportional increase in the revenue. • Self-organizing Networks (SON) provide automation solution for planning, configuration, management, optimization, and healing of mobile RAN functions that emerged out from 4G LTE environment and IMS technology. • SON provides efficient, and in some cases, programmatic means of fine tuning cellular networks. • SON systems are part of next generation OSS/BSS technologies for mobile network operators to automate previously manual network optimization procedures.
Self-extracting file:	• A type of compressed file that you can execute (e.g., double-click on the filename) to begin the decompression process; no other decompression utility is required. Example: on IBM PC or compatibles, certain files with an ".exe" extension and on Macintoshes, all files with a ".sea" extension.
Session Initiation Protocol (SIP)	• Designed in 1996 and specified by International Engineering Task Force (IETF), Session Initiation Protocol (SIP) is a signaling protocol used for a variety of purposes in IP networks. • SIP is principally a mechanism employed to seamlessly create, modify and terminate sessions involving multiple participants. • Such sessions could be Internet telephone calls, multimedia conferences or multicast sessions. • SIP can work with any type of media content. • SIP is independent of the transport layer and can therefore be used with multiple transport protocols.

Spam	• Email spam, also known as junk email or unsolicited bulk email (UBE), is a subset of spam that involves nearly identical messages sent to numerous recipients by email. Definitions of spam usually include the aspects that email is unsolicited and sent in bulk. Spammers collect email addresses from chatrooms, websites, customer lists, newsgroups, and viruses which harvest users' address books, and are sold to other spammers. They also use a practice known as "email appending" or "epending" in which they use known information about their target (such as a postal address) to search for the target's email address.
Streaming (streaming media)	• A technique for transferring data over the Internet so that a client browser or plug-in can start displaying it before the entire file has been received; used in conjunction with sound and pictures. Example: The Flash Player plug-in from Adobe Systems gives your computer the capability for streaming audio; RealPlayer is used for viewing sound and video.
Spyware	• Any software that covertly gathers user information, usually for advertising purposes, through the user's Internet connection.
Telnet	• A generic term that refers to the process of opening a remote interactive login session regardless of the type of computer you're connecting to.
Turing Test	• In the 1950s Alan Turing created the Turing Test which is used to determine the level of intelligence of a computer.
TIFF	• Tag Image File Format; a popular file format for storing bit-mapped graphic images on desktop computers. • The graphic can be any resolution and can be black and white, gray-scale, or color. Files of this type usually have the suffix ".tif" as part of their name.
Time Division Multiplexing (TDM)	• A form of data handling and signaling in which a common channel is used for transmitting and receiving information. • This in contrast to the use of Internet Protocol (IP) and other packet switching methods that do not require use of a dedicated path, but rather instead transmit information as packets of data, often over diverse paths to traverse from data sender to data receiver.
UNIX	• A popular multitasking computer system often used as a server for electronic mail or for a web site. • UNIX also is the leading operating system for workstations, although increasingly there is competition from Windows NT which offers many of the same features while running on PC or compatible computer.
Unstructured Data	• Typically defined as data that does not have a defined data model and not organized in a manner that is conducive to analysis via traditional tools, unstructured data is often voluminous and difficult to manage with traditional data management technologies, tools, and techniques. • Accordingly, Big Data Analytics are often utilized to derive actionable information from raw data, which may come from anything from social media networks to sensors that capture machine-generated data from industrial processes or machines such as a jet engine.
URL	• Uniform Resource Locator; a means of identifying resources on the Internet. A full URL consists of three parts: the protocol (e.g., FTP, gopher, http, nntp, telnet); the server name and address; and the item's path. • The protocol describes the type of item and is always followed by a colon (:). The server name and address identifies the computer where the information is stored and is preceded by two slashes (//). • The path shows where an item is stored on the server and what the file is called; each segment of the location s preceded by a single slash (/).
Virtual Reality	• Virtual Reality (VR) focuses on virtual experience through realistic interaction with 3D content presented in a digitally generated space. • VR depends upon data from human sensory organs such as stereoscopic Images, sound, and bio-signals to enhance the VR experience.
Virus	• A program intended to alter data on a computer in an invisible fashion, usually for mischievous or destructive purposes. Viruses are often transferred across the Internet as well as by infected diskettes and can affect almost every type of computer. Special antivirus programs are used to detect and eliminate them.
VoIP	• Voice over Internet Protocol; a means of using the Internet as the transmission medium for phone calls. An advantage is you do not incur any additional surcharges beyond the cost of your Internet access.

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WAIS	• Wide Area Information Server; a program for finding documents on the Internet. Usually found on gopher servers to enable searching text-based documents for a particular keyword.
Workstation	• A graphical user interface (GUI) computer with computing power somewhere between a personal computer and a minicomputer (although sometimes the distinction is rather fuzzy). Workstations are useful for development and for applications that require a moderate amount of computing power and relatively high quality graphics capabilities.

EXERCISE

1. ICT stands for : **[December-2004]**
(a) International Communication Technology
(b) Intera Common Terminology
(c) Information and Communication Techn-ology
(d) Inter connected Terminals

2. Which of the following is the appropriate definition of Information Technology ? **[December-2004]**
(a) Information Technology refers to the use of hardware and software for processing information
(b) Information Technology refers to the use of hardware and software for distribution of useful information
(c) Information Technology refers to the use of hardware and software for storage, retrieval, processing and distributing information of many kinds.
(d) Information Technology refers to the use of principles of Physical sciences and Social sciences for processing of information of many kinds.

3. Which of the following is correct statement ? **[December-2004]**
(a) Computers can be used for diagnosing the difficulty of a student in learning a subject
(b) Psychological testing can be done with the help of computer provided a software is available
(c) A set of instructions is called a programme
(d) All the above

4. The acronym RAM Used in computer terminology stands for **[June-2005]**
(a) Random Access Memory
(b) Research Aptitude Model
(c) Read Access Memory
(d) None of the choices

5. The acronym INSAT stands for: **[June-2005]**
(a) India Satellite
(b) Indian National Satellite
(c) Indian National Satellite training
(d) None of the choices

6. Which of the following is not the characteristic of a computer? **[December-2005]**
(a) computer is an electrical machine
(b) computer cannot think at its own
(c) computer processes information error free
(d) computer can hold data for any length of time

7. In web search, finding a large number of documents with very little relevant information is termed: **[June-2006]**
(a) poor recall (b) web crawl
(c) poor precision rate (d) poor web response

8. Using websites to pour out one's grievances is called: **[June-2006]**
(a) cyber venting (b) cyber ranting
(c) web hate (d) web plea

9. Which of the following is the appropriate definition of a computer? **[December-2006]**
(a) Computer is a machine that can process information.
(b) Computer is an electronic device that can store, retrieve and process both qualitative and quantitative data quickly and accurately.
(c) Computer is an electronic device that can store, retrieve and quickly process only quantitative data.
(d) Computer is a machine that can store, retrieve and process quickly and accurately only qualitative information

10. LAN stands for: **[December-2006]**
(a) Local And National (b) Local Area Network
(c) Large Area Network (d) Live Area Network

11. "Dpi" stands for: **[June-2007]**
(a) Dots per inch (b) Digits per unit
(c) Dots pixel inch (d) Diagrams per inch

12. On the keyboard of computer each character has an "ASCII" value which stands for: **[June-2007]**
(a) American Stock Code for Information Interchange
(b) American Standard Code for Information Interchange
(c) African Standard Code for Information Interchange
(d) Adaptable Standard Code for Information Change

13. RAM means: **[December-2007]**
(a) Random Access Memory
(b) Rigid Access Memory
(c) Rapid Access Memory
(d) Revolving Access Memory

14. Data can be saved on backing storage medium known as : **[December-2007]**
(a) Compact Disk Recordable
(b) Computer Disk Rewritable
(c) Compact Disk Rewritable
(d) Computer Data Rewritable

15. The 'brain' of a computer which keeps peripherals under its control is called: **[December-2007]**
(a) Common Power Unit
(b) Common Processing Unit
(c) Central Power Unit
(d) Central Processing Unit

16. CD ROM stands for: **[December-2007]**
(a) Computer Disk Read Only Memory
(b) Compact Disk Read Over Memory
(c) Compact Disk Read Only Memory
(d) Computer Disk Read Over Memory

17. www represents: **[December-2007]**
(a) who what and where (b) weird wide web
(c) word wide web (d) world wide web

18. WYSIWYG - describes the display of a document on screen as it will actually print: **[June-2008]**
(a) What you state is what you get
(b) What you see is what you get
(c) What you save is what you get
(d) What you suggest is what you get

19. Errors in computer programmes are called: **[December-2008]**
(a) Follies (b) Mistakes
(c) Bugs (d) Spam

20. Which of the following is the appropriate definition of a computer? **[December-2008]**
(a) Computer is a machine that can process information.
(b) Computer is an electronic device that can store, retrieve and process both qualitative and quantitative data quickly and accurately.
(c) Computer is an electronic device that can store, retrieve and quickly process only quantitative data.
(d) Computer is a machine that can store, retrieve and process quickly and accurately only qualitative information

21. A compiler is used to convert the following to object code which can be executed **[December-2009]**
(a) High-level language (b) Low-level language
(c) Assembly language (d) Natural language

22. Which one of the following is not a network device ? **[December-2009]**
(a) Router (b) Switch
(c) Hub (d) CPU

23. Which one of the following is not a linear data structure ? **[December-2009]**
(a) Array (b) Binary Tree
(c) Queue (d) Stack

24. bit stands for **[December-2009]**
(a) binary information term (b) binary digit
(c) binary tree (d) Bivariate Theory

25. Which is the largest unit of storage among the following ? **[December-2009]**
(a) Terabyte (b) Megabyte
(c) Kilobyte (d) Gigabyt

26. Which of the following is not related to information security on the Internet? **[December-2009]**
(a) Data Encryption (b) Water marking
(c) Data Hiding (d) Information Retrieval

27. Where does a computer add and compare its data ? **[June-2010]**
(a) CPU (b) Memory
(c) Hard disk (d) Floppy disk

28. S/MIME in Internet technology stands for **[December-2010]**
(a) Secure Multipurpose Internet Mail Extension
(b) Secure Mult imedia Internet Mail Extension
(c) Simple Multipurpose Internet Mail Extension
(d) Simple Multimedia Internet Mail Extension

29. The set of computer programs that manage the hardware/ software of a computer is called **[December-2010]**
(a) Compiler system
(b) Operation system
(c) Operating system
(d) None of these

30. HTML stands for **[June-2011]**
(a) Hyper Text Markup Language
(b) Hyper Text Manipulation Language
(c) Hyper Text Managing Links
(d) Hyper Text Manipulating Links

31. DNS in internet technology stands for **[June-2011]**
(a) Dynamic Name System
(b) Domain Name System
(c) Distributed Name System
(d) None of these

32. IPv4 and IPv6 are addresses used to identify computers on the internet. **[December-2011]**
Find the correct statement out of the following:
(a) Number of bits required for IPv4 address is more than number of bits required for IPv6 address.
(b) Number of bits required for IPv4 address is same as number of bits required for IPv6 address.
(c) Number of bits required for IPv4 address is less than number of bits required for IPv6 address.
(d) Number of bits required for IPv4 address is 64.

33. The term DNS stands for **[December-2011]**
(a) Domain Name System
(b) Defense Nuclear System
(c) Downloadable New Software
(d) Dependent Name Server

34. If (y)x represents a number y in base x, then which of the following numbers is smallest of all ? **[December-2011]**
(a) (1111)2 (b) (1111)8
(c) (1111)10 (d) (1111)16

35. The term 'SITE' stands for **[December-2011]**
(a) Satellite Indian Television Experiment
(b) Satellite International Television Experiment
(c) Satellite Instructional Television Experiment
(d) Satellite Instructional Teachers Education

36. Photo bleeding means **[December-2011]**
(a) Photo cropping (b) Photo placement
(c) Photo cutting (d) Photo colour adjustment

37. Minimum number of bits required to store any 3 digit decimal number is equal to **[June-2012]**
(a) 3 (b) 5
(c) 8 (d) 10

38. Which of the following is not a programming language? **[June-2012]**
(a) Pascal (b) Microsoft Office
(c) Java (d) C++

39. Each character on the keyboard of computer has an ASCII value which stands for **[June-2012]**
(a) American Stock Code for Information Interchange
(b) American Standard Code for Information Interchange
(c) African Standard Code for Information Interchange
(d) Adaptable Standard Code for Information Change

40. A Personal Computer uses a number of chips mounted on a circuit board called **[December-2012]**
(a) Microprocessor (b) System Board
(c) Daughter Board (d) Mother Board

41. ALU stands for **[December-2012]**
(a) American Logic Unit (b) Alternate Local Unit
(c) Alternating Logic Unit (d) Arithmetic Logic Unit

42. A Gigabyte is equal to **[June-2013]**
(a) 1024 Megabytes (b) 1024 Kilobytes
(c) 1024 Terabytes (d) 1024 Bytes

43. A hard disk is divided into tracks which is further subdivided into **[June-2013]**
(a) Clusters (b) Sectors
(c) Vectors (d) Heads

44. 'www' stands for **[June-2013]**
(a) work with web (b) word wide web
(c) world wide web (d) worth while web

45. CLASS stands for **[September-2013]**
(a) Complete Literacy and Studies in Schools
(b) Computer Literates and Students in Schools
(c) Computer Literacy and Studies in Schools
(d) Centre for Literacy and Studies in Schools

46. GIF stands for **[September-2013]**
(a) Global Information Format
(b) Graphics Information Format
(c) Graphics Interchange File
(d) Graphics Interchange Format

47. The acronym FTP stands for **[June-2014]**
(a) File Transfer Protocol (b) Fast Transfer Protocol
(c) File Tracking Protocol (d) File Transfer Procedure

48. Which of the following is not an input device ? **[December-2015]**
(a) Microphone (b) Keyboard
(c) Joystick (d) Monitor

49. In a Computer a byte generally consists of : **[December-2015]**
(a) 4 bits (b) 8 bits
(c) 16 bits (d) 10 bits

50. NMEICT stands for : **[December-2015]**
(a) National Mission on Education through ICT
(b) National Mission on E-governance through ICT
(c) National Mission on E-commerce through ICT
(d) National Mission on E-learning through ICT

51. A definition that has a meaning that is deliberately assigned to some symbol is called : **[December-2015]**
(a) Lexical (b) Precising
(c) Stipulative (d) Persuasive

52. The statement "the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer Hardware" refers to **[July-2016]**
(a) Information Technology (IT)
(b) Information and Collaborative Technology (ICT)
(c) Information and Data Technology (IDT)
(d) Artificial Intelligence (AI)

53. An ASCII is a character-encoding scheme that is employed by personal computers in order to represent various characters, numbers and control keys that the computer user selects on the keyboard. ASCII is an acronym for **[July-2016]**
(a) American Standard Code for Information Interchange
(b) Americn Standard Code for Intelligent Information
(c) American Standard Code for Information Integrity
(d) American Standard Code for Isolated Information

54. is a type of memory circuitry that holds the computer's start-up routine. **[July-2016]**
(a) RIM (Read Initial Memory)
(b) RAM (Random Access Memory)
(c) ROM (Read Only Memory)
(d) Cache Memory

55. In Computer Networking, HTTP is referred to as a stateless protocol as servers do not maintain any information about past client requests. HTTP is an acronym for **[August-2016]**

(a) Hyper Text Translation Protocol
(b) Hyper Text Transfer Protocol
(c) High TeraByte Transfer Protocol
(d) Hypervisor Test Translation Protocol

56. Random Access Memory (RAM), a form of computer storage, is a ..... memory. **[August-2016]**
(a) Non-volatile (b) Volatile
(c) Permanent (d) Secondary

57. DVD technology uses an optical media to store the digital data. DVD is an acronym for **[January-2017]**
(a) Digital Vector Disc (b) Digital Volume Disc
(c) Digital Versatile Disc (d) Digital Visualization Disc

58. Which of the following correctly lists computer memory types from highest to lowest speed ? **[January-2017]**
(a) Secondary Storage; Main Memory (RAM); Cache Memory; CPU Registers
(b) CPU Registers; Cache Memory; Secondary Storage; Main Memory (RAM)
(c) CPU Registers; Cache Memory; Main Memory (RAM); Secondary Storage
(d) Cache Memory; CPU Registers; Main Memory (RAM); Secondary Storage

59. Which of the following statement (s) is/are TRUE ?
S1 : The decimal number 11 is larger than the hexadecimal number 11.
S2 : In the binary number 1110.101, the fractional part has the decimal value as 0.625. **[January-2017]**
(a) S1 only (b) S2 only
(c) Both S1 and S2 (d) Neither S1 nor S2

60. Which of the following represents billion characters ? **[November-2017]**
(a) Terabytes (b) Megabytes
(c) Kilobytes (d) Gigabytes

61. What is the full form of USB as used in computer related activities ? **[November-2017]**
(a) Ultra Security Block (b) Universal Security Block
(c) Universal Serial Bus (d) United Serial Bus

62. Which of the following domains is used for - profit businesses? **[November-2017]**
(a) .org (b) .net
(c) .edu (d) .com

63. What is the name for a webpage address ? **[November-2017]**
(a) Domain (b) Directory
(c) Protocol (d) URL

64. Which of the following statements, regarding the term ICT is/are TRUE ? **[July-2018]**
P : ICT is an acronym that stands for Indian Classical Technology.
Q : Converging technologies that exemplify ICT include the merging of audio-visual, telephone and computer networks through a common cabling system.
(a) P only (b) Q only
(c) P and Q (d) Neither P nor Q

65. SIM means **[December-2018]**
(a) Subscriber Identity Module
(b) Subscriber Information Module
(c) System Information Module
(d) Special Identity Module

66. Jatin's laptop bas a LCD screen. The acronym LCD stands for: **[20th June 2019 (Second Shift)]**
(a) Light Crystal Display
(b) Liquid Compact Display
(c) Light Compact Display
(d) Liquid Crystal Display

67. A computer network which is used within a building is called a: **[20th June 2019 (Second Shift)]**
(a) WAN (b) MAN (c) LAN (d) SAN

68. Anjali's teacher uses VLE, a software tool designed to deliver courses online. The acronym VLE stand for: **[21st June 2019 (First Shift)]**
(a) Video Learning Environment
(b) Visual Learning Environment
(c) Virtual Learning Environment
(d) Visual Local Environment

69. In the context of IT/ICT, which one of the following statements about spamming is true? [**21st June 2019 (Second Shift)]**
(a) Spamming is posting or e-mailing unslicited advertising messages to a wide audience
(b) Spamming is sending lines of nonsensical garbage in a chat conversation
(c) Spamming is posting a message that contain graphic description of something offensive
(d) Spamming is an attempt to acquire sensitive information for malicious reasons, by masquerading as trustworthy entity

70. Which one of the following pairs LEAST matches in respect of computers? **[24th June 2019 (First Shift)]**
(a) 1 Giga Byte: (1024) × (1024) × (1024) × 8 bits
(b) CRT: Cathode Ray tube
(c) ROM: Rapid Online Memory
(d) CPU: Central Processing Unit

71. What is meant by the term RAM? **[25th June 2019 (Second Shift)]**
(a) Memory which can only be read
(b) Memory which can only be written to
(c) Memory which is used for permanent storage
(d) Memory which can be both read and written to

72. Which of the following file format is not a video file format? **[26th June 2019 (First Shift)]**
(a) AVI (b) MOV (c) MP4 (d) JPEG

73. SMTP is an acronym for: **[26th June 2019 (First Shift)]**
(a) Simple Mail Transport Protocol
(b) Simple Mail Terminal Protocol
(c) Simple Mail Transfer Protocol
(d) Simple Mail Transition Protocol

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74. Which of the following is not considered as a form of secondary storage?

[26th June 2019 (Second Shift)]

(a) RAM (b) Floppy Disk
(c) Optical Disk (d) Flash Drive

75. Which statement is true about Random Access Memory (RAM) in a computer system?

[21st **June 2019 (Second Shift)]**

(a) RAM is non-volatile and the amount of RAM in a computer system cannot affect its performance
(b) RAM is non-volatile and the amount of RAM in a computer system can affect its performance
(c) RAM is volatile and the amount of RAM in a computer cannot affect its performance
(d) RAM is volatile and the amount of RAM in a computer system can affect its performance

76. In computer related activities, what is the full form of 'WORM'?

[2nd Dec. 2019 (First Shift)]

(a) Write On Random Memory
(b) Write On Real Memory
(c) Write Once Read Many
(d) Write Once Read Memory

77. Which of the following storage devices stores maximum amount of data?

[3rd Dec. 2019 (Second Shift)]

(a) Compact disc (b) Floppy disc
(c) Hard disc (d) Magnetic optic disc

78. _____represents raw facts. whereas _____ is processed meaningful data. **[3rd Dec. 2019 (Second Shift)]**

(a) Information. Bits
(b) Records. Bytes
(c) Data, Information
(d) Information, Reporting

79. VDU stands for

[3rd Dec. 2019 (Second Shift)]

(a) Virtual Display Unit
(b) Virtual Detection Unit
(c) Visual Display Unit
(d) Visual Detection Unit

80. Database WOS stands for

[4th Dec. 2019 (First Shift)]

(a) Web of Science (b) Web of Sources
(c) World of Science (d) Web of Service

81. ____ is a wireless technology built in electronic gadgets for transferring data over short distance

[4th Dec. 2019 (First Shift)]

(a) WiFi (b) Bluetooth
(c) Modem (d) USB

82. PCI stands for **[4th Dec. 2019 (First Shift)]**

(a) Partial Component Interconnect
(b) Partial Component Interaction
(c) Peripheral Component Interconnect
(d) Peripheral Component Interaction

83. Which of the following statements are correct?

[5th Dec. 2019 (Second Shift)]

(A) Google's web browser is called 'Chrome'
(B) Apples web browser is called 'Safari'
(C) "Mozilla firefox" is an open source web browsing software

Choose the correct option:

(a) (A) and (B) only (b) (A) and (C) only
(c) (B) and (C) only (d) (A), (B) and (C)

84. Match List-I with List-II

[6th Dec. 2019 (Second Shift)]

List-I (Software)		List-II (Description)	
A.	Web browser	(i)	Prepare written documents
B.	Word processor	(ii)	Create and edit web pages
C.	Spreadsheet	(iii)	Connect to websites and display web pages
D.	Web authoring	(iv)	Analyze and summarize numerical data

Choose the correct answer from the options given below:

(a) A – (ii); B – (iv); C – (i); D – (iii)
(b) A – (iii); B – (i); C – (iv); D – (ii)
(c) A – (iii); B – (i); C – (ii); D – (iv)
(d) A – (ii); B – (i); C – (iv); D – (iii)

85. Which of the following is a search engine?

[2nd Dec. 2019 (Second Shift)]

(a) Internet (b) Bing
(c) Skype (d) Acrobat Reader

HINTS & EXPLANATION

1. (c) Information and communication technology (ICT) is an extensional term for information technology (IT) that stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals), computers as well as necessary enterprise software, middleware, storage, and audio.

2. (c) Information technology is the use of computers to store, retrieve, transmit, and manipulate data, or information, often in the context of a business or other enterprise. IT is considered to be a subset of information and communications technology.

3. (d) Computers may be used to help share assignments, engage in various activities, provide real-time communication experiences with others. Computer-based test interpretation (CBTI) programs are technological tools that have been commonly used to interpret data in psychological assessments since the 1960s. A set of instructions that directs a computer's hardware to perform a task is called a program, or software program.

4. (a) Random access memory (RAM) is a form of computer data storage that stores data and machine code currently being used. A random access memory device allows data to be read or written in almost the same amount of time irrespective of the physical location of data inside the memory.

5. (b) The Indian National Satellite System, or INSAT, is a series of multipurpose geo-stationary satellites launched by ISRO to satisfy the telecommunications, broadcasting, meteorology, and search and rescue operations.

6. (a) Computer is not an electrical machine; it is a computer considered to be an electronic device.

7. (a) In web search, recall is defined as the fraction of relevant documents that are retrieved and precision is the fraction of retrieved documents that are relevant. Finding a large number of documents with very little relevant information is termed poor recall.

8. (a) The term cyberventing means venting your anger by electronic means. Using websites to pour out one's grievances is called cyber venting. Disgruntled employees are setting up Web sites to provide a forum for complaints.

9. (b) Computer is an electronic device that can store, retrieve and process both qualitative and quantitative data quickly and accurately.

10. (b) LAN stands for local-area network is a computer network that spans a relatively small area. Most often, a LAN is confined to a single room, building or group of buildings.

11. (a) DPI stands for Dots Per Inch which technically means printer dots per inch. Today it is a term often misused, usually to mean PPI, which stands for Pixels Per Inch.

12. (b) ASCII stands for American Standard Code for Information Interchange.

13. (a) RAM means Random Access Memory, a type of computer memory that can be accessed randomly; that is, any byte of memory can be accessed without touching the preceding bytes.

14. (c) Data can be saved on backing storage medium known as Compact Disk Rewritable. A CD-RW compact disc (CD-RWs) can be written, read, erased, and written again arbitrarily many times.

15. (d) The computer brain is a microprocessor called the central processing unit (CPU). The CPU is a chip containing millions of tiny transistors. It's the CPU's job to perform the calculations necessary to make the computer work.

16. (c) CD ROM stands for Compact Disk Read Only Memory.

17. (d)

18. (b)

19. (c) A software bug is an error, flaw, failure or fault in a computer program or system that causes it to produce an incorrect or unexpected result, or to behave in unintended ways.

20. (b) Computer is an electronic device that can store, retrieve and process both qualitative and quantitative data quickly and accurately.

21. (a) A Compiler is a computer program that translates code written in a high level language to a lower level language, object/machine code. The most common reason for translating source code is to create an executable program (converting from a high level language into machine language).

22. (d) The central processing unit (CPU) is the unit which performs most of the processing inside a computer. To control instructions and data flow to and from other parts of the computer, the CPU relies heavily on a chipset. CPU doesn't have to do anything with networking.

23. (b) A tree is a nonlinear data structure, compared to arrays, linked lists, stacks and queues which are linear data structures. A tree can be empty with no nodes or a tree is a structure consisting of one node called the root and zero or one or more subtrees.

24. (b) A binary digit, or bit, is the smallest unit of information in a computer. It is used for storing information and has a value of true/false, or on/off. An individual bit has a value of either 0 or 1, which is generally used to store data and implement instructions in groups of bytes.

25. (a) A Terabyte (TB) is a measure of computer storage capacity that is approximately 2^{40} bytes, or 10^{12} bytes, which equals approximately a trillion bytes. A Terabyte is more precisely defined as 1,024 gigabytes (GB), while a petabyte consists of 1,024 TB.

26. (b) Originally a watermark is a more or less transparent image or text that has been applied to a piece of paper, another image to either protect the original image, or to make it harder to copy the item e.g. money watermarks or stamp watermarks.

27. (a) A central processing unit (CPU) is the electronic circuitry within a computer that carries out the instructions of a computer program by performing the basic arithmetic, logical, control and input/output (I/O) operations specified by the instructions.

28. (a) S/MIME in Internet technology stands for Secure Multipurpose Internet Mail Extension. It is a secure method of sending e-mail that uses the Rivest-Shamir-Adleman encryption system.

29. (a) A compiler accepts a program written in a high level language as input and produces its machine language equivalent as output. For the purpose of compiler construction, a high level programming language is described in terms of grammar.

30. (a) Hypertext Markup Language (HTML) is the standard markup language for creating web pages and web applications. With Cascading Style Sheets (CSS) and JavaScript, it forms a triad of cornerstone technologies for the World Wide Web.

31. (b) Domain Name System (DNS) is the Internet's system for converting alphabetic names into numeric IP addresses. For example, when a Web address (URL) is typed into a browser, DNS servers return the IP address of the Web server associated with that name. In this made-up example, the DNS converts the URL www.company.com into the IP address 204.0.8.51.

32. (c) Number of bits required for IPv4 address is less than number of bits required for IPv6 address.

33. (a) The Domain Name System (DNS) is an Internet service that translates domain names into IP addresses. Because domain names are alphabetic, they're easier to remember. The Internet however, is really based on IP addresses.

34. (c) (1111)10 is smallest number.

35. (c) The Satellite Instructional Television Experiment or SITE was an experimental satellite communications project launched in India in 1975, designed jointly by NASA and the Indian Space Research Organization (ISRO).

36. (d) Artwork and background colours often extend into the bleed area. After trimming, the bleed ensures that no unprinted edges occur in the final trimmed document.

37. (d) Minimum number of bits required to store any 3 digit decimal number is equal to 10.

38. (b) Microsoft office is not a programming language but a family of client software, server software, and services developed by Microsoft.

39. (b) ASCII (American Standard Code for Information Interchange) is the most used character coding system. It defines 128 characters numbered from 0 to 127 and coded in binary on 7 bits from 0000000 to 1111111.

40. (d) The Motherboard itself is a printed circuit board that allows the CPU, RAM, and all other computer hardware components to communicate with each other. A Chipset is basically the middle man in a PC as it transfers data from part to part.

41. (d) An arithmetic-logic unit (ALU) is the part of a computer processor (CPU) that carries out arithmetic and logic operations on the operands in computer instruction words. In some processors, the ALU is divided into two units, an arithmetic unit (AU) and a logic unit (LU).

42. (a) Gigabyte (GB) - 1 GB is equal to 1024 MB.

43. (b) A hard disk is usually divided into concentric rings, called tracks, and these in turn are divided into sectors. This division is used to specify locations on the hard disk and to allocate disk space to files.

44. (b) The World Wide Web (www) is an information space where documents and other web resources are identified by Uniform Resource Locators (URLs), interlinked by hypertext links, and accessible via the Internet.

45. (c) The Computer Literacy Studies in Schools (CLASS) project was introduced with the introduction of BBC micro computers. A total of 12,000 such computers were received and distributed to Secondary and Senior Secondary Schools through State Governments. The project was subsequently adopted as a Centrally Sponsored Scheme during the 8th Plan (1993-98).
Currently, CLASS is a component of the ICT scheme; the other component being ET(Educational Technology).

46. (d) GIF stands for Graphics Interchange Format. GIF is an image file format commonly used for images on the web and sprites in software programs. Unlike the JPEG image format, GIFs uses lossless compression that does not degrade the quality of the image.

47. (a) The File Transfer Protocol (FTP) is a standard network protocol used for the transfer of computer files between a client and server on a computer network. FTP is built on a client-server model architecture using separate control and data connections between the client and the server.

48. (d) A computer monitor is an output device that displays information in pictorial form. A monitor usually comprises the display device, circuitry, casing, and power supply.

49. (b) In most computer systems, a byte is a unit of data that is eight binary digits long. A byte is the unit most computers use to represent a character such as a letter, number or typographic symbol.

50. (a) NMEICT stands for National Mission on Education through Information and Communication Technology. It is an initiative taken by the Government of India to become a knowledge super power by efficiently utilizing our human resource.

51. (a) ICT is the main instrument for the creation of computer networks and the applications based on them. It also supports the spread of information and knowledge, separating the content from the place where it belongs physically.

52. (a) lnformation technology (IT) is "the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware."

53. (a) ASCII (American Standard Code for Information Interchange) is the most common format for text files in computers and on the Internet. In an ASCII file, each alphabetic, numeric, or special character is represented with a 7-bit binary number (a string of seven 0s or Is).

54. (c) ROM (read only memory) is a type of memory circuitry that holds the computer's startup routine.ROM is placed in a single integrated circuit, generally a fairly large, caterpillar-like DIP package that is plugged into the motherboard.

55. (b) HyperText Transfer Protocol (HTTP) is an application-layer protocol used primarily on the World Wide Web. HTTP uses a client-server model where the web browser is the client and communicates with the web server that hosts the website.

56. (b) In today's technology, RAM is normally associated with volatile types of memory (such as DRAM modules), where stored information is lost if power is removed, although non-volatile RAM has also been developed.

57. (c) DVD stands for "digital versatile disc" or "digital video disc" is a digital optical disc storage format invented and developed by Philips, Sony, Toshiba, and Panasonic in 1995.

58. (c) Computer memory from highest to lowest speed: CPU Registers; Cache Memory; Main Memory (RAM); Secondary Storage.

59. (b) Hexadecimal Number 11 to decimal
$= 16 + 1 = 17.$

Obviously this will be much bigger than decimal number 11. So first statement (S1) is wrong. In second statement, we've to find the decimal value of $(0.101)_2$

So,

$1 \times 2^{-1} + 0 \times 2^{-2} + 1 \times 2^{-3} = 0.5 + 0 + 0.125$

$= 0.625$

Hence, second statement (S2) is right.

60. (d) A gigabyte is a unit of data storage capacity that is roughly equivalent to 1 billion bytes.

61. (c) USB (abbreviated for Universal Serial Bus) is an industry standard that establishes specifications for cables, connectors and protocols for connection, communication and power supply between personal computers and their peripheral devices.

62. (d) The domain name com is a top-level domain (TLD) in the Domain Name System of the Internet. Its name is derived from the word commercial, indicating its original intended purpose for domains registered by commercial organizations. Later, the domain opened for general purposes.

63. (d) A Uniform Resource Locator (URL) is the address of a resource on the Internet. A URL indicates the location of a resource as well as the protocol used to access it.

64. (b) Q only

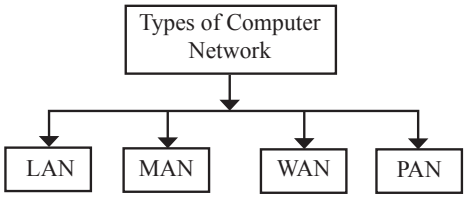
Information and Communications Technology (ICT) refers to all the technology used to handle telecommunications, broadcast media, intelligent building management systems, audiovisual processing and transmission systems, and network-based control and monitoring functions.

The audio-visual (TV), telephone and computer networks (Internet) are provided through a single optical cable.

65. (a) A SIM card, also known as a subscriber identity module, is a smart card that stores data for GSM cellular telephone subscribers. Such data includes user identity, location and phone number, network authorization data, personal security keys, contact lists and stored text messages. Security features include authentication and encryption to protect data and prevent eavesdropping.

66. (d) The acronym 'LCD' stands for Liquid Crystal Display. LCD is a type of flat panel display which uses liquid crystals in its primary form of operation. LCDs were a big leap in terms of the technology they replaced, which include light-emitting diode **(LED)** and gas-plasma displays. LCDs allowed displays to be much thinner than cathode ray tube **(CRT)** technology.

67. (c) A computer network is a group of computers linked to each other that enables the computer to communicate with another computer and share their resources, data, and applications. A computer network can be categorized by their size. A computer network is mainly of four types:



LAN (Local Area Network): It is a group of computers connected to each other in a small area such as building, office. LAN is used for connecting two or more personal computers through a communication medium such as twisted pair, coaxial cable, etc.

68. (c) The acronym 'VLE' stands for Virtual Learning Environment. VLE is a system for delivering learning materials to students via the web. These systems include assessment, student tracking, collaboration and communication tools. They can be accessed both on and off-campus, meaning that they can support students' learning outside the lecture hall 24 hours a day, seven days a week.

69. (a) Spamming is the use of electronic messaging systems like e-mails and other digital delivery systems and broadcast media to send unwanted bulk messages indiscriminately. The term spamming is also applied to other media like in internet forums, instant messaging, and mobile text messaging, social networking spam, junk fax transmissions, television advertising and sharing network spam.

70. (c) Read-only memory (ROM) is a type of non-volatile memory used in computers and other electronic devices. Data stored in ROM cannot be electronically modified after the manufacture of the memory device.

71. (d) Random Access Memory is the memory or information storage in a computer that is used to store running programs and data for the programs. Data (information) in the RAM can be read and written quickly in any order. *Random Access Memory* (RAM) is also sometimes known as read-write memory or *RWM.*

72. (d) JPEG stands for "Joint Photographic Experts Group". It is a standard image format for containing lossy and compressed image data.

73. (c) SMTP is an acronym for the Simple Mail Transfer Protocol. It is a communication protocol for electronic mail transmission.

74. (a) Random access memory (RAM) is volatile and all information that was stored in RAM is lost when the computer is turned off. Volatile memory is temporary memory while ROM (read-only memory) is non-volatile and holds data permanently when the power is turned off.

75. (d) *Random access memory* (*RAM*) is a type of data storage used in computers that is generally located on the motherboard. This type of memory is volatile and all information that was stored in *RAM* is lost when the computer is turned off.

76. (c) 'WORM' when used in all capital letters in computer related activities is an acronym for for 'write once, read many'. It is an optical disk technology that allows you to write data onto a disk just once. After that, the data is permanent and can be read any number of times.

77. (c) The storage devices called as Hard disk can be used to store maximum amount of data. Hard disk is an electromechanical information stockpiling gadget that has attractive capacity to store and recover computerized data utilizing at least one unbending quickly turning circles covered with attractive material.

78. (c) **Data, Information:** Data is a raw and unorganized fact that is required to be processed to make it meaningful whereas Information is a set of data that is processed in a meaningful way according to the given requirement.

79. (c) VDU Stands for "Visual Display Unit." It displays images generated by a computer or other electronic device. The term VDU is often used synonymously with "monitor," but it can also refer to another type of display, such as a digital projector.

80. (a) WOS stands for *Web of Science. It is* the most powerful research engine, delivering your library with best-in-class publication and citation data for confident discovery, access and assessment. It is guided by the legacy of Dr Eugene Garfield, inventor of the world's first citation index.

81. (b) Bluetooth is a wireless communication technology that uses short-range radio signals to transmit data between two Bluetooth-enabled computers or other devices such as mobile tablets etc. to communicate with each other. It was invented by Dutch electrical engineer Jaap Haartsen, working for telecom vendor Ericsson in 1994.

82. (c) PCI stands for "Peripheral Component Interconnect. It is a hardware bus used for adding internal components to a desktop computer.

83. (d) Google's web browser is called Chrome. It is developed as a cross-platform web browser. It was first released in 2008 for Microsoft Windows, and was later ported to Linux, macOS, iOS, and Android. On January 7, 2003, Steve Jobs launched its own web browser, called Safari. It was based on Apple's internal fork of the KHTML rendering engine, called WebKit. Mozilla Firefox, or simply Firefox, is a free and open-source web browser developed by the Mozilla Foundation and its subsidiary, Mozilla Corporation. Firefox uses the Gecko layout engine to render web pages.

84. (b) A web browser is a software application for accessing information on the World Wide Web. A word processor is a device or computer program that provides for input, editing, formatting and output of text, often with some additional features. A spreadsheet is a computer application for organization, analysis and storage of data in tabular form. Web authoring software is a type of desktop publishing tool that allows users to navigate the tricky environment of HTML and web coding by offering a different kind of graphical user interface.

85. (b) *Bing* is a web search engine launched by Microsoft in 2009. Bing provides a variety of search services, including web, video, image and map search products. As of October 2018, Bing is the third largest search engine globally, with a query volume of 4.58%, behind Google (77%) and Baidu (14.45%).

The internet is the wider network that allows computer networks around the world run by companies, governments, universities and other organisations to talk to one another.

Skype is software that enables the world›s conversations. Many people and businesses use *Skype* to make free video and voice one-to-one and group calls, send instant messages and share files with other people on *Skype*.

Adobe Acrobat is a family of application software and Web services developed by Adobe Inc. to view, create, manipulate, print and manage files in Portable Document Format.

CHAPTER 34

Basic of Internet

The Internet is simply a series of computers, linked to one another around the world, communicating almost instantaneously with one another. It comprises tens and thousands of computer networks (a single network may link of all the computers of an office; A larger network may be connecting all the computers within a university premises) communicating with each other like a big net or web! It can be termed as a 'network of networks'. Computer networks are physically linked with one another through telephone, radio, cable lines, satellite, or even fiber optic.

TYPES OF COMPUTER NETWORK

Local Area Network (LAN):	• LAN connects two or more communication devices (like computers and printers) over a relatively short distance. • LANs usually work within an office premises, a factory or a campus where communication devices are connected through a cable, within a distance of 2000 feet. • Most LAN networks shared medium networks, where the workstations shares and waits for its turn to use a resource such as printer, plotter etc.
Wireless Local Area Network (WLAN)	• Wireless local area network provides LAN connectivity within a small geographic area, normally within 150 meters and is typically used where cabling is either not possible or would be very cumbersome, for instance, you may wish to provide LAN connectivity in an open air restaurant.
Bluetooth Technology	• Bluetooth technology is a wireless medium for sharing information across computers and other electronic devices like mobile phones, Personal Digital Assistants (PDAs) etc, using low power radio frequency.
Wide Area Network (WAN)	• WAN networks span larger areas than a single building or a campus. They are long-haul networks covering wide geographical areas and often require multiple communication connections like leased lines, satellites, and microwave radio links to interconnect various LANs. LANs are usually measured in feet, while WANs are measured in miles.
Metropolitan Area Networks (MAN)	• A group of LANs connected through a high-speed, seamless interconnection, within a 'metropolitan' area, is termed as a Metropolitan Area Network (MAN). • The word 'metropolitan' does not necessarily mean a 'city' but can be any area that is spread out, but is treated as one entity, e.g. a company having its two buildings on the opposite sides of the road. • MAN connects users with computer resources in a geographic area that is larger than that covered by a LAN but smaller than the area covered by a WAN.

INTERNET CONNECTIVITY OPTIONS

There are various options available to connect to the Internet. The commonly used ones are explained below.

Dial-Up	• Dial-up provides, connecting a device to a network using modem over the public telephone network. • Dial-up access is really just like a phone connection, except that instead of two individuals on the two ends you have computer devices. • Since the dial-up uses the regular telephone lines, the quality of connection is not always good.
Integrated Services Digital Network (ISDN)	• ISDN, as the name suggests, is a digital communications line. • It allows for transmission of data, voice, video, and graphics, at very high speeds, over standard communication lines. • ISDN lines can carry large amounts of data, while providing a single common interface to access digital communication services required for varying devices, while keeping it transparent to the end user. • Owing to these features, ISDN applications have revolutionized the way businesses communicate. • ISDN is not restricted to public telephone networks, but can use packet switched networks, CATV networks, telex etc.

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Digital Subscriber Lines (DSL)	• A DSL connection is a very high-speed connection that uses the same wires as a regular telephone line. • Many local companies, in addition to their regular phone services, also provide Internet services (DSLs). DSLs are, therefore, available in some (not all) areas where regular phone services are available. • A DSL connection has a much higher speed of connection, than a regular dial-up connection (56 kbps) and the connection can be left open, while we use our phone line for voice calls. • The reliability and monthly rates for a DSL connection are comparable to that of the cable network service, but the connection speed is slower.
Leased Line	• An alternative way to connect two computers is through a leased line. • It is like a 'private circuit' between the two machines. • A leased line can best be understood, as a permanent dedicated communication link between two points and is reserved, exclusively for the leased line purchaser. • A leased line can be a twisted pair, coax cable, or (more recently) a fibre optic cable. • Leased lines have varying data transfer rates, going up to a speed of 1.544 Mbps. • Using multiplexing techniques, these transfer rates can be divided between voice and data. • Large companies having high Internet usage, usually go in for leased lines since it is a more cost effective solution than the traditional one like ISDN.
Cable Internet Services	• Today, in addition to the traditional cable services, most of the cable TV companies also provide Internet services. • These services come at reasonable monthly rates, reliable and have high download transmission and upload rates.

Domain Naming System (DNS)

- In a network, computers and devices can be grouped together and can be administered as a unit with common rules and procedures, sharing a common name. Such a group is referred to as a Domain.
- Domain Naming System (or Service), commonly known as the DNS, is an Internet service that translates domain names to or from IP addresses, which is the actual basis of addressing on the Internet.
- The Domein suffix as the last three letters of the address, provides information about the kind of body to which the address belongs, e.g., .edu for educational .org for organizational, .com for commercial

Communication Protocol

When different computers, peripherals and devices are connected in a network they need to follow a set of standard rules for transmitting and receiving data to avoid data collision. These set of rules and conventions are called Protocols. Transmission Control Protocol (TCP) and Internet Protocol (IP) are two distinct network protocols. They are so commonly used together that TCP/IP has become a standard terminology to refer to either or both of the protocols.

INTRANET

- Unlike the Internet where a page can be accessed globally, an intranet or internal website is a private network for a corporation or organization that only those with permission can access. A computer residing on an intranet is often using IP addresses in the reserved address space. That computer cannot be accessed outside of the local network unless given permission through the Internet.
- The intranet is essentially a small-scale version of the internet, operating with similar functionality, but existing solely within the firm. Like the internet, the intranet uses network technologies such as Transmission Control Protocol/ Internet Protocol (TCP/IP). It allows for the creation of internal networks with common internet applications that can allow them to communicate with different operating systems.

Table of Comparison Intranet and the Internet:

Parameter	Internet	Intranet
Usage	Public	Private
User Types	Any user having dial up of internet access line.	Organization employees and internal company departments
Usage	Access all kind of information	Internal employee communication table directories etc.
Security	Low security. Configured under 0 security level in firewall	High security. Configured under 100 security level in firewall
Regulated by	Internet Architecture Board (IAB) : Oversees the technical and engineering development of the IETF and IRTF. Internet corporation for Assigned Names and Numbers (ICANN).	It is regulated by an organization
Coverage	Wide Area	Within an organization
Access	Large number of users	Limited number of users
System failure	Unpredictable	System availability is high since system is monitored by authority

EMAIL ADDRESS

An e-mail address normally consists of three parts in a sequence going from the specific to the general:

i. The ID of the User
ii. The "@" Sign
iii. The domain name given by the DNS (Domain Naming System).

Example: khurshid.editorial@aiets.co.in

Here, **khurshid.editorial** is the user id and **aiets.co.in** is the domain name separated by @

ANATOMY OF EMAIL MESSAGE

Messages in an electronic mail consist of three major sections.

i. The message header;
ii. The message body; and
iii. The attachment(s)

i. The Header:

It contains control information, including, minimally, an originator's email address and one or more recipient addresses. Usually, additional information is added, such as a subject header field structured into fields like summary, sender, receiver, and other information about the e-mail. The message header generally includes at least the following fields:

From:

It includes the e-mail address and, optionally, the name of the sender who sends the email. The field is filled up automatically when a message is sent.

To:

Here the e-mail address/es and, optionally, name/s of the message's recipient/s is/are included. It indicates primary recipient, for secondary recipients Carbon copy (Cc) and Blind Carbon Copy (Bcc) is used to make the data individual to other recipient. The "To:" field is similar to the addressing at the top of a conventional letter which is delivered according to the address on the outer envelope. Many e-mail clients will mark e-mail in the inbox differently depending on whether the addresses are in the "To:" or "Cc:" list.

Subject:

A brief summary of the message.

Date:

The local time and date when the message was written. Many email clients fill this in automatically when sending. The recipient's client may then display the time in the format and time zone local to her.

Message-ID

Message-ID is a unique identifier for a digital message, most commonly a globally unique identifier used in email and Usenet newsgroups. It is also an automatically generated field used to prevent multiple deliveries and for reference in "In-Reply-To". The "In-Reply-To" field is used to link related messages together.

2. The Body

The e-mail clients generally allow the use of either plain text or HTML for the message body at the option of the user. HTML e-mail messages often include an automatically-generated plain text copy as well, for reason of compatibility. The body sometimes contains a signature block at the end. This is exactly the same as the body of a regular letter. The header is separated from the body by a blank line.

3. Attachments

The attachments are the files that are sent through the email. Many email systems do not allow the software or the file that contains "setup.exe" to be sent through email as attachments.

Some Email service providers		
Sl. No.	**Name**	**URL**
(1)	AIM Mail	(http://webmail.aol.com)
(2)	Gmail	(http://mail.google.com)
(3)	MSN Hotmail / Windows Live Mail	(http://mail.live.com)
(4)	Rediffmail	(http://www.rediff.com)
(5)	Yahoo! Mail	(https://login.yahoo.com)

AUDIO CONFERENCING

Audio conferencing is the use of voice communications equipments to establish an audio link between geographically dispersed per¬sons, one that allows them to conduct a conference.

Merits and Demerits of Audio Technologies

Merits		Demerits	
1.	Equipment required to setup audio conference is simple and less expensive	1.	Difficult to explain abstract concepts on audio conference due to lack of visual information.
2.	Options for selecting Telephone or speaker phones and a telephone networks are many.	2.	It is difficult to learn through audio information only.
3.	Audio conference can be easily recorded by the students themselves for reference.	3.	Scheduling is necessary and coordination between teacher availability and student convenience is needed.
4.	Students can participate in the conference from anywhere.	4.	Since eye contact is not possible it is difficult to retain attention of students.

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VIDEO CONFERENCING

Video conferencing is a line virtual connection between people in separate locations for the purpose of communication, usually involving audio and often text as well as video. At its simplest, videoconferencing provides transmission of static images and text between two locations. At its most sophisticated, it provides transmission of full-motion video images and high-quality audio between multiple locations.

Advantage /Disadvantages of Video Technologies

Advantages	Disadvantages
They allow both audio and video communications. Hence are suitable for teaching that involves demonstrations.	Are expensive and the infrastructure at each site may be unaffordable for many institutions.
Video medium supports visuals related to lab experiments and animations and thus explains abstract topics.	Requires teachers trained to teach through this technology, and requires a crew with camera men and other technical experts. Effective programmes require rehearsals with teachers and technical team.
They encourage interactive learning.	The programmes are scheduled and learners need to be present at the time of transmission.

EXERCISE

1. Which of the following statement is correct ? **[December-2004]**
(a) Virus improves the speed of processing information through computer
(b) Internet does not allow the virus to spread
(c) Virus is a part of software
(d) Virus is an operating system

2. Which of the following statement is NOT correct ? **[December-2004]**
(a) Computer is capable of processing only digital signal
(b) Computer is capable of analysing both quantitative and qualitative data
(c) Appropriate software is required for processing the data
(d) Computer is capable of processing digital as well as analog signals

3. Which one of the following is not a computer language? **[June-2005]**
(a) COBOL (b) FORTRAN
(c) IUM (d) PASCAL

4. Virus in computer is related with **[June-2005]**
(a) Dust Particles (b) Hardware
(c) Malware (d) All of the choices

5. In the hypermedia database, information bits are stored in the form of : **[December-2005]**
(a) signals (b) cubes
(c) nodes (d) symbols

6. Line access and avoidance of collision are the main functions of : **[December-2005]**
(a) the CPU (b) the monitor
(c) network protocols (d) wide area networks

7. Video transmission over the Internet that looks like delayed livecasting is called: **[June-2006]**
(a) virtual video (b) direct broadcast
(c) video shift (d) real-time video

8. Which of the following is the appropriate format of URL of e-mail? **[December-2006]**
(a) www_mail.com (b) www@mail.com
(c) www@mail.com (d) www.mail.com

9. Transfer of data from one application to another line is known as: **[June-2007]**
(a) Dynamic Disk Exchange
(b) Dodgy Data Exchange
(c) Dogmatic Data Exchange
(d) Dynamic Data Exchange

10. Which part of the Central Processing Unit (CPU) performs calculation and makes decisions: **[June-2007]**
(a) Arithematic Logic Unit (b) Alternating Logic Unit
(c) Alternate Local Unit (d) American Logic Unit

11. An E-mail address is composed of: **[June-2008]**
(a) two parts (b) three parts
(c) four parts (d) five parts

12. A key-board has at least: **[June-2008]**
(a) 91 keys (b) 101 keys
(c) 111 keys (d) 121 keys

13. 'Micro Processing'is made for: **[December-2008]**
(a) Computer (b) Digital System
(c) Calculator (d) Electronic Goods

14. HTML is basically used to design: **[December-2008]**
(a) Web-page (b) Web-site
(c) Graphics (d) Tables and Frames

15. The accounting software 'Tally' was developed by: **[December-2008]**
(a) HCL (b) TCS
(c) Infosys (d) Wipro

16. Information, a combination of graphics, text, sound, video and animation is called: **[December-2008]**
(a) Multiprogramme (b) Multifacet
(c) Multimedia (d) Multiprocess

17. Which was the first company to launch mobile phone services in India? **[June-2009]**
(a) Essar (b) BPL
(c) Hutchison (d) Airtel

18. What do you need to put your web pages on the www? **[June-2009]**
(a) a connection to internet (b) a web browser
(c) a web server (d) all of the above

19. Which one of the following is different from other members? **[June-2010]**
(a) Google (b) Windows
(c) Linux (d) Mac

20. Which one of the following is an example of Operating System? **[June-2010]**
(a) Microsoft Word (b) Microsoft Excel
(c) Microsoft Access (d) Microsoft Windows

21. Computers on an internet are identified by **[June-2010]**
(a) e-mail address (b) street address
(c) IP address (d) None of the above

22. 1 GB is equal to **[December-2010]**
(a) 230 bits (b) 230 bytes
(c) 220 bits (d) 220 bytes

23. The binary equivalent of $(-15)_{10}$ is (2's complement system is used) **[December-2010]**
(a) 11110001 (b) 11110000
(c) 10001111 (d) None of these

24. The hexadecimal number system consists of the symbols **[December-2010]**
(a) 0 – 7 (b) 0 – 9 , A – F
(c) 0 – 7, A – F (d) None of these

25. The binary equivalent of $(-19)^{10}$ in signed magnitude system is **[June-2011]**
(a) 11101100 (b) 11101101
(c) 10010011 (d) None of these

26. The octal number system consists of the following symbols: **[June-2011]**
(a) 0 – 7 (b) 0 – 9
(c) 0 – 9, A – F (d) None of the above

27. HTML is used to create **[December-2011]**
(a) machine language program
(b) high level program
(c) web page
(d) web server

28. Video-Conferencing can be classified as one of the following types of communication : **[June-2012]**
(a) Visual one way (b) Audio-Visual one way
(c) Audio-Visual two way (d) Visual two way

29. _____ is a protocol used by e-mail clients to download e-mails to your computer. **[December-2012]**
(a) TCP (b) FTP
(c) SMTP (d) POP

30. The file extension of MS-Word document in Office 2007 is _____. **[December-2012]**
(a) .pdf (b) .doc
(c) .docx (d) .txt

31. Computer Virus is a **[December-2012]**
(a) Hardware (b) Bacteria
(c) Software (d) None of these

32. Virtual memory is **[June-2013]**
(a) an extremely large main memory.
(b) an extremely large secondary memory.
(c) an illusion of extremely large main memory.
(d) a type of memory used in super computers.

33. Which one of the following is not an Operating System ? **[September-2013]**
(a) IBM AIX (b) Linux
(c) Sun Solaris (d) Firefox

34. Commercial messages on the net are identified as **[September-2013]**
(a) Net ads (b) Internet commercials
(c) Webmercials (d) Viral advertisements

35. Identify the IP address from the following: **[June-2014]**
(a) 300 · 215 · 317 · 3 (b) 302 · 215@ 417 · 5
(c) 202 · 50 · 20 · 148 (d) 202 – 50 – 20 – 148

36. Which one of the following is not the same as the other three? **[June-2014]**
(a) MAC address (b) Hardware address
(c) Physical address (d) IP address

37. When a computer is booting, BIOS is loaded to the memory by **[June-2014]**
(a) RAM (b) ROM
(c) CD-ROM (d) TCP

38. The first web browser is **[June-2014]**
(a) Internet Explorer (b) Netscape
(c) World Wide Web (d) Firefox

39. Which one of the following is not a/an image/graphic file format? **[June-2014]**
(a) PNG (b) GIF
(c) BMP (d) GUI

40. Photographs are not easy to **[June-2014]**
(a) publish (b) secure
(c) decode (d) change

41. gif, jpg, bmp, png are used as extensions for files which store **[December-2014]**
(a) Audio data (b) Image data
(c) Video data (d) Text data

42. CSS stands for **[December-2014]**
(a) Cascading Style Sheets
(b) Collecting Style Sheets
(c) Comparative Style Sheets
(d) Comprehensive Style Sheets

43. Which is an instant messenger that is used for chatting? **[June-2015]**
(a) Altavista (b) MAC
(c) Microsoft Office (d) Google Talk

44. Which of the following is not open source software? **[June-2015]**
(a) Internet explorer (b) Fedora Linux
(c) Open office (d) Apache HTTP server

45. Which of the following represents one billion characters? **[June-2015]**
(a) Kilobyte (b) Megabyte
(c) Gigabyte (d) Terabyte

46. Which of the following is not an output device? **[June-2015]**
(a) Printer (b) Speaker
(c) Monitor (d) Keyboard

47. Encoding or scrambling data for transmission across a network is known as: **[June-2015]**
(a) Protection (b) Detection
(c) Encryption (d) Decryption

48. Which of the following is an open source software ? **[December-2015]**
(a) MS Word (b) Windows
(c) Mozilla Firefox (d) Acrobat Reader

49. The process of copying files to a CD-ROM is known as **[July-2016]**
(a) Burning (b) Zipping
(c) Digitizing (d) Ripping

50. Which one of the following represents the binary equivalent of the decimal number 25? **[June-2015]**
(a) 10101 (b) 01101
(c) 11001 (d) 11011

51. Which of the following enables us to send the same letter to different persons in MS Word ? **[December-2015]**
(a) Mail join (b) Mail copy
(c) Mail insert (d) Mail merge

52. Which of the following is an instant messaging application? **[December-2015]**
(A) Whats App (B) Google Talk (C) Viber
Select the correct answer from the codes given below :
(a) (A) and (B) only (b) (B) and (C) only
(c) (A) only (d) (A), (B) and (C)

53. If the binary equivalent of the decimal number 48 is 110000, then the binary equivalent of the decimal number 51 is given by **[July-2016]**
(a) 110011 (b) 110010
(c) 110001 (d) 110100

54. An unsolicited e-mail message sent to many recipients at once is a **[July-2016]**
(a) Worm (b) Virus
(c) Threat (d) Spam

55. The software used to navigate through the web is known as **[August-2016]**
(a) Website (b) Web Browser
(c) Internet (d) World Wide Web

56. If one GigaByte is equal to 230 Bytes of data storage, then 1024 TeraBytes is equal to ..... bits of data storage. **[August-2016]**
(a) 250 (b) 253
(c) 240 (d) 256

57. With regard to e-mail, what does Bcc : mean? **[August-2016]**
(a) Blind Computer Communication : - The users specified in the Bcc : field will get the e-mail and see the addresses in the to : and cc : fields.
(b) Blind Carbon Copy : - The users specified in the Bcc : field will get the email and see the addresses in the to : and cc : fields.
(c) Blind Computer Communication :- The users specified in the Bcc : field will get the e-mail but it will be an audio file because this is how blind people get e-mail.
(d) Blind Carbon Copy : The users specified in the Bcc : field will get the email but will not see the addresses in the to : and cc : fields.

58. With regard to a word processing software, the process of combining static information in a publication together with variable information in a data source to create one merged publication is called **[January-2017]**
(a) Electronic mail (b) Data sourcing
(c) Mail merge (d) Spam mail

59. Which of the following is a characteristic of Web2.0 applications ? **[January-2017]**
(a) Multiple users schedule their time to use Web2.0 applications one by one.
(b) Web2.0 applications are focused on the ability for people to collaborate and share information online.
(c) Web2.0 applications provide users with content rather than facilitating users to create it.
(d) Web2.0 applications use only static pages.

60. The data storage hierarchy consists of : **[November-2017]**
(a) Bytes, bits, fields, records, files and databases
(b) Bits, bytes, fields, records, files and databases
(c) Bits, bytes, records, fields, files and databases
(d) Bits, bytes, fields, files, records and databases

61. Given the following email fields, which of the email addresses will 'swami' be able to see when he receives the message ? **[July-2018]**
To… ram@test.com
Cc… raj@test.com; ravi@test.com
Bcc… swami@test.com; rama@test.com
(a) ram@test.com
(b) ram@test.com; raj@test.com; ravi@test.com
(c) ram@test.com; rama@test.com
(d) ram@test.com; rama@test.com; raj@test. com; ravi@ test.com

62. Which of the following printers use dry ink powder? **[December-2018]**
(a) Ink Jet Printer (b) Dot Matrix Printer
(c) Laser Printer (d) Thermal Printer

63. Internet Explorer, Mozilla Firefox and Opera are referred to as : **[December-2018]**
(a) Application Software (b) Web Servers
(c) Browsers (d) System Software

64. Firewalls are used to protect a computer on a network against: **[December-2018]**
(a) Fire attacks (b) Unauthorized attacks
(c) Internal attacks (d) Authorized attacks

65. In comparison to secondary storage, the primary storage is: **[December-2018]**
(a) Faster and more expensive
(b) Slower and more expensive
(c) Faster and lesser expensive
(d) Slower and lesser expensive

66. Put the following units of storage into the correct order, starting with the smallest unit first and going down to the largest unit : **[July-2018]**
(A) Kilobyte (B) Byte
(C) Megabyte (D) Terabyte
(E) Gigabyte (F) Bit
Give your answer from the following code :
(a) (F), (B), (A), (C), (D), (E)
(b) (F), (B), (A), (D), (E), (C)
(c) (F), (B), (A), (C), (E), (D)
(d) (F), (B), (A), (D), (C), (E)

67. With regard to computer memory, which of the following statement(s) is/are TRUE ? **[July-2018]**
P : Read Only Memory (ROM) is 'volatile' memory.
Q : Random Access Memory (RAM) is 'volatile' memory.
R : Secondary Memory is 'volatile' memory.
(a) P only (b) Q only
(c) P and Q only (d) P and R only

68. A new Laptop has been produced that weighs less, is smaller and uses less power than previous Laptop models. Which of the following technologies has been used to accomplish this ? **[July-2018]**
(a) Universal Serial Bus Mouse
(b) Faster Random Access Memory
(c) Blu Ray Drive
(d) Solid State Hard Drive

69. Which one of the following is correct ? **[December-2018]**
(a) $(17)_{10} = (17)_{16}$ (b) $(17)_{10} = (17)_{8}$
(c) $(17)_{10} = (10111)_{2}$ (d) $(17)_{10} = (10001)_{2}$

70. Which one of the following computer compoents is fastest in terms of speed of access? **[20th June 2019-Ist Shift]**
(a) USB Drive (b) Solid State Drive
(c) RAM (d) Hard Disk Drive

71. While sending an e-mail, to differentiate among To: Cc: and Bcc: fields, which one of the following statements is True? **[20th June 2019-Ist Shift]**
(a) Recipients in the To: field can see the email addresses that are in the Bcc: and Cc: fields.
(b) Recipients in the Cc: field can see the email addresses that are in the To: and Bcc: fields.
(c) Recipients in the Bcc: field can see the email addresses that are in the To: and Cc: fields.
(d) Only the recipients in the Cc: field can see the other email addresses in the Bcc: field.

72. Software that you can download for free, but have to pay to continue its use after a trial period is called: **[20th June 2019-Ist Shift]**
(a) public domain software
(b) freeware
(c) open-source software
(d) shareware

73. In Internet terminology, what does the acronym WYSIWYG stand for? **[20th June 2019-Ist Shift]**
(a) Why You Saw Is What You Got
(b) What You See Is What You Get
(c) Where You See Is Where You Got
(d) What You See Is What You Got

74. Why would **BCC:** be used in an e-mail? **[20th June 2019-IInd Shift]**
(a) BCC: allows the recipient to identify all the other recipients in the list when a group email address is used.
(b) BCC: allows the sender to indicate who the email is for if there is more than one recipient.
(c) BCC: allows the sender of a message to conceal the recipient entered in the BCC: field from the other recipients.
(d) BCC: allows recipients to be visible to all other recipients of the message.

75. Which of the following is an example of proprietary system software? **[20th June 2019-IInd Shift]**
(a) Linux
(b) Microsoft Internet explorer
(c) Microsoft office
(d) Microsoft windows

76. What is spyware in respect of computer software? **[21st June 2019-Ist Shift]**
(a) Software that aims to gather information about a person without his/her knowledge, and that may send such information to another entity.
(b) Legitimate software that allows companies to monitor and supervise the computers of their employees from a central location.
(c) Software used to disrupt computer operation or gain access to private computer systems.
(d) A computer program hidden within another seemingly harmless program that produces copies of itself into another programs or files.

77. A virus type that is capable of transferring from one computer to another without any 'user interaction' is known as **[21st June 2019-IInd Shift]**
(a) Worm (b) Trojan
(c) Key logging (d) Boot sector virus

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78. What is the decimal equivalent of binary number 1100110?
[21st June 2019-Ist Shift]
(a) 102 (b) 204
(c) 153 (d) 51

79. What is the binary equivalent of decimal number 75?
[21st June 2019-IInd Shift]
(a) 1101001 (b) 101001
(c) 100101 (d) 1001011

80. Which of the following statements(s) is/are true in respect of wireless technology? **[24th June 2019-Ist Shift]**
P: Bluetooth is a wireless technology which can be used to connect a headset to a mobile phone.
Q: Bluetooth is a long-range wireless technology and is a low cost means of data transfer.
(a) P only (b) Q only
(c) Both P and Q (d) Neither P nor Q

81. Which of the following is a type of malware intentionally inserted into a software system that will setoff a malicious function when specified conditions are met?
[24th June 2019-Ist Shift]
(a) Worm (b) Trojan
(c) Spyware (d) Logic bomb

82. Select the option that shows the storage devices in order of capacity from lowest to highest.
[24th June 2019-Ist Shift]
(a) CD–ROM, DVD–ROM, Blu–ray
(b) Blu–ray, CD–ROM, DVD–ROM
(c) DVD–ROM, Blu–ray, CD–ROM
(d) DVD–ROM, CD–ROM, Blu–ray

83. In Audio and Video compression, the term RGB means:
[24th June 2019-IInd Shift]
(a) Red, Grey, Blue (b) Red, Green, Blue
(c) Red, Green, Black (d) Red, Grey, Black

84. One Terabyte (TB) of memory is equal to:
[24th June 2019-IInd Shift]
(a) 1024 KB
(b) 1024 × 1024 KB
(c) 1024 × 1024 × 1024 KB
(d) 1024 × 1024 × 1024 Bytes

85. Mailed questionnaire, observation, interview and collective questionnaire are instances of:
[24th June 2019-IInd Shift]
(a) Secondary sources (b) Personal sources
(c) Primary sources (d) Tertiary sources

86. Computer uses which number system to store data and perform calculations **[25th June 2019-IInd Shift]**
(a) Binary (b) Octal
(c) Decimal (d) Hexadecimal

87. Joint Photographic Experts Group (JPEG) is used to compress _____.
[25th June 2019-Ist Shift]
(a) Music (b) Video
(c) image (d) Frame

88. The main two components of CPU are _____.
[25th June 2019-Ist Shift]
(a) Control unit and ALU
(b) ALU and BUS
(c) Control unit and registers
(d) Registers and main memory

89. A computer has main memory of 960 Kbytes. What is the exact number of bytes contained in this memory?
[26th June 2019-Ist Shift]
(a) 960 × 8 (b) 960 × 1000
(c) 960 × 1024 (d) 960 × 1024 × 1024

90. The convenient place to store contact information for quick retrieval in e-mail is:
[26th June 2019-Ist Shift]
(a) Address box (b) Message box
(c) Address book (d) Message book

91. Which of the following devices enables a computer to transmit data over telephone lines?
[26th June 2019-IInd Shift]
(a) CPU (b) Hub
(c) Switch (d) Modem

92. Which of the following is NOT suitable in the context of E-mail?
[2nd Dec. 2019-Ist Shift]
(a) It is a letter sent over a computer network
(b) It can be used to send unsolicited messages
(c) E-mail is snail-mail
(d) E-mail address includes domain name

93. Which of the following is a type of LAN ?
[2nd Dec. 2019-IInd Shift]
(a) Ethernet (b) Token Ring
(c) FDDI (d) all of the above

94. Which of the following statements is / are correct?
[4th Dec. 2019-IInd Shift
(A) Softwaxe is loaded into secondary storage from RAM and is then executed by the CPU.
(B) A search engine is a software system that is designed to search for information on the WWW.
Choose the correct option :
(a) (A) only (b) (B) only
(c) Both (A) and (B) (d) Neither (A) nor (B)

95. Select the option that lists components for a cyberspace address (URL) in the correct order from beginning to end?
[4th Dec. 2019-IInd Shift
(a) Protocol, domain name of the host, path / file
(b) Path I file, protocol, domain name of the host
(c) Protocol, path /file, domain name of the host
(d) Domain name of the host, protocol, path / file

96. Which of the following statements is / are correct?
[5th Dec. 2019-Ist Shift]
(A) WWW is a network of networks that first started with four computer nodes.
(B) W W W is a service that runs on the Internet. Choose the correct option:
(a) (A) only (b) (B) only
(c) Both (A) and (B) (d) Neither (A) nor (B)

97. Which of the following statements is/are correct?
[5th Dec. 2019-IInd Shift]
(A) It is usually faster to access data stored in RAM than that in hard drive
(B) The hexadecimal number 99 is the same as the decimal number 99
Choose the correct option:
(a) (A) only (b) (B) only
(c) Both (A) and (B) (d) Neither (A) not (B)

98. Given below are two statements, one is labelled Assertion (A) and the other is labelled as Reason (R).
[6th Dec. 2019-IInd Shift]
Assertion (A): The clock speed of CPUs has not increased significantly in recent years.
Reason (R): Software now being used is faster and therefore processors do not have to be faster.
In the light of the above two statements, choose the correct option from those given below:
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true and (R) is NOT the correct explanation of (A)
(c) (A) is true but (R) is false
(d) (A) is true but (R) is true

99. Which of the following is/are major issues arising out of the growing reliance on information technology?
[6th Dec. 2019-Ist Shift]
A. Protability B. Security threats
C. Privacy concerns
Choose the correct option:
(a) (A) and (B) only (b) (A) and (C) only
(c) (B) and (C) only (d) (A), (B) and (C)

100. Which of the following statements is/are correct?
[6th Dec. 2019-IInd Shift]
A. The clock speed of a CPU is measured in hertz (Hz)
B. Bluetooth technology consumes more power than Wi-Fi technology
Choose the correct answer from the options given below:
(a) A only (b) B only
(c) Both A and B (d) Neither A nor B

101. Select the option that includes le formats suitable for distributing sound les across the internet.
[6th Dec. 2019-Ist Shift]
(a) Wmv,mp4,wma,mp3 (b) Avi,midi,wav,mp3
(c) Avi,mov,wmv,mp3 (d) Midi,wav,wma,mp3

102. Which of the following statements is/are correct?
[6th Dec. 2019-IInd Shift]
A. A Local Area Network (LAN) is usually located on one brand of computer
B. The acronym 'ISP' stands for Internet Standard Provider
Choose the correct answer from the options given below:
(a) A only (b) B only
(c) Both A and B (d) Neither A nor B

103. A/An _____ is a computer program that spreads by inserting copies of itself into other executable code or documents.
[24th June 2019-IInd Shift]
(a) Operating system (b) Computer Virus
(c) Firewall (d) Anti-virus

104. Which of the following is not a/an web browser?
[24th June 2019-IInd Shift]
(a) Internet Explorer (b) Mozilla Firefox
(c) Google Chrome (d) Yahoo

105. Which of the following is used to create web pages?
[25th June 2019-Ist Shift]
(a) HTTP (b) URL
(c) FTP (d) HTML

106. Which of the following is a search Engine?
[25th June 2019-Ist Shift]
(a) Flash (b) Fire fox
(c) internet explorer (d) Google

107. Which one of the following tasks is associated with changing appearance of a document in word processing?
[4th Dec. 2019-Ist Shift]
(a) Editing (b) Formatting
(c) Writing (d) Printing

108. Select the option that contains only optical storage media
[5th Dec. 2019-Ist Shift]
(a) USB memory stick, Blu - Ray disk, CD - ROM, DVD
(b) DVD, CD - ROM, USB memory stick, CD - RW
(c) Hard disk, USB memory stick, CD - ROM, DVD
(d) DVD, CD - R, Blu - Ray Disk, CD - RW

109. Select the option that contains only computer input devices
[5th Dec. 2019-IInd Shift]
(a) Keyboard, Mouse, Joystick, Printer
(b) Mouse, Monitor, Joystick, Keyboard
(c) Joystick, Keyboard, Digitiser, Monitor
(d) Joystick, Keyboard, Mouse, Digitiser

110. Select the option that contains exclusively the text file formats **[6th Dec. 2019-IInd Shift]**
(a) JPEG, MP3, RTF (b) CSV, RTF, TXT
(c) GIF, JPEG, MP3 (d) CSV, MP3, PDF

111. Select the true statement about an operating system (OS)?
[24th June 2019-Ist Shift]
(a) An OS controls peripheral, allocates memory and organises data into fields and records.
(b) An OS provides protection against viruses and controls peripherals.
(c) An OS controls peripheral, and allocates memory and processor time.
(d) An OS controls the processor and peripherals and allows the user to connect to the internet.

112. Which of the following statements is/are correct?
[6th Dec. 2019-Ist Shift]
A. For the sequence of integers represented in binary as 00111, 01001, 01011, P…. the next integer P would be represented as 01101
B. A byte is a binary number consisting of exactly 8 bits
Choose the correct option:
(a) (A) only (b) (B) only
(c) Both (A) and (B) (d) Neither (A) and (B)

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113. With respect to computers, which one of the following best describes **phishing**?

[20th June 2019-IInd Shift]

(a) A malicious program installed on a system that stays concealed to avoid detection.
(b) A method of bypassing normal authentication procedures over a connection to a network.
(c) A type of unsolicited bulk email of identical messages sent to numerous recipients.
(d) An attempt to acquire sensitive information for malicious reasons, by masquerading as a trustworthy entity.

114. A message beneath a message is labelled as

[December-2010]

(a) embedded text (b) internal text
(c) inter-text (d) sub-text

115. Which of the following communication technologies employ only asynchronous communication?

[6th Dec. 2019-Ist Shift]

A. Video conferencing B. Email
C. Forums D. Instant messaging
Choose the correct option:
(a) (A) and (C) only (b) (B) and (D) only
(c) (B) and (C) only (d) (A) and (D) only

116. Match List-I with List-II in the context of computer networking: **[6th Dec. 2019-Ist Shift]**

List-I	List-II
(A) VOIP	i. Makes use of light pulses to transmit data
(B) Fibre-optic cable	ii. Use of internet to make phone calls
(C) URL	iii. Most appropriate to connect computers in a small building
(D) UTP cable	iv. Text used by web browsers to locate a web address on the Internet.

Choose the correct option:
(a) (A)-(iv), (B)-(i), (C)-(ii), (D)-(iii)
(b) (A)-(ii), (B)-(i), (C)-(iv), (D)-(iii)
(c) (A)-(ii), (B)-(iii), (C)-(iv), (D)-(i)
(d) (A)-(iv), (B)-(iii), (C)-(ii), (D)-(i)

117. Match List - I with List - II

List I	List II
(A) 50 in decimal	(i) 0110010 in binary
(B) 102 in decimal	(ii) 1100110 in binary
(C) Real - Time video conferencing	(iii) Synchronous communication
(D) SMS texting	(iv) Asynchronous communication

Choose the correct option from those given below:

[5th Dec. 2019-Ist Shift]

(a) (A)-(ii), (B)-(i), (C)-(iii), (D)-(iv)
(b) (A)-(ii), (B)-(i), (C)-(iv), (D)-(iii)
(c) (A)-(i), (B)-(ii), (C)-(iii), (D)-(iv)
(d) (A)-(ii), (B)-(ii), (C)-(iv), (D)-(iii)

118. Which of the following is a computer based system that stores and manipulates data which are viewed from a geographical point or reference?

[3rd Dec. 2019-IInd Shift]

(a) Database System
(b) Geographical Information System
(c) Geographic System
(d) Software System

119. Match the following:

[24th June 2019-IInd Shift]

Set-I	Set-II
(A) First Generation	(i) Transistor
(B) Second Generation	(ii) VLSI microprocessor
(C) Third Generation	(iii) Vacuum tube
(D) Fourth Generation	(iv) Integrated circuit

	(A)	(B)	(C)	(D)
(a)	(iii)	(iv)	(i)	(ii)
(b)	(iii)	(i)	(iv)	(ii)
(c)	(iii)	(i)	(ii)	(iv)
(d)	(i)	(iii)	(iv)	(ii)

120. Consider the following storage devices:

[2nd Dec. 2019-Ist Shift]

(A) Hard disc
(B) CD-ROM
(C) DVD-ROM
Arrange these in ascending order of storage capacity and select the correct option :
(a) (B), (C), (A) (b) (B), (A), (C)
(c) (C), (B), (A) (d) (A), (C), (B)

121. Which number system is usually followed in a typical 32-bit computer ? **[2nd Dec. 2019-Ist Shift]**

(a) 2 (b) 8
(c) 10 (d) 16

122. A dialogue between a human-being and a computer programme that occurs simultaneously in various forms is described as: **[2nd Dec. 2019-Ist Shift]**

(a) man-machine speak (b) binary chat
(c) digital talk (d) interactivity

HINTS & EXPLANATION

1. (c) A computer virus is a type of malicious software that, when executed, replicates itself by modifying other computer programs and inserts its own code. When this replication succeeds, the affected areas are then said to be "infected" with a computer virus.

2. (a) A computer is a device that can be instructed to carry out sequences of arithmetic or logical operations automatically via computer programming.

3. (c) The International University of Monaco (IUM) is located in the Principality of Monaco, Monte-Carlo on the French Riviera.

4. (c) A computer virus is a type of malicious software that, when executed, replicates itself by modifying other computer programs and inserting its own code. When this replication succeeds, the affected areas are then said to be "infected" with a computer virus.

5. (a) In the hypermedia database, information bits are stored in the form of signals.

6. (c) Line access and avoidance of collision are the main functions of network protocols.

7. (d) The transmission of live video. It implies that there is no delay at the receiving side, or at most, imperceptible delays. Although a video broadcast that is streamed live may be considered real-time video, there is an intentional, buffered delay at the receiving end.

8. (b) The general format of an email address is local-part@ domain, and a specific example is jsmith@example.com.

9. (d) Transfer of data from one application to another line is known as Dynamic Data Exchange.

10. (a) Arithmatic Logic Unit of the Central Processing Unit (CPU) performs calculation and makes decisions. An arithmetic logic unit is a combinational digital electronic circuit that performs arithmetic and bitwise operations on integer binary numbers.

11. (a) An E-mail address is composed of two parts - a username and a domain name, in the following form: *username@domainname.extension*. The username is the name you choose to be identified with for e-mail purposes and that you have provided to the e-mail host to create your e-mail account. The extension can be any of many options, such as .com, .org, .fr (country codes), .biz, .info, .gov, .int, etc.

12. (b) There is no standard computer keyboard: the original PC keyboard with 84 keys, the AT keyboard also with 84 keys and the enhanced keyboard with 101 keys.

13. (b) Microprocessing is made for digital system.

14. (a) Hypertext Markup Language (HTML) is the standard markup language for creating web pages and web applications. With Cascading Style Sheets (CSS) and JavaScript, it forms a triad of cornerstone technologies for the World Wide Web.

15. (b) Tally Solutions Pvt. Ltd. is an Indian multinational company that provides enterprise resource planning software. It is headquartered in Bangalore, Karnataka. The company claims that its software is used by more than 1 Million customers.

16. (c) Multimedia is more than one concurrent presentation medium (for example, on CD-ROM or a Web site). Multimedia is typically used to mean the combination of text, sound, and/or motion video.

17. (c) The licence to operate in Mumbai circle was awarded to Hutchison Max by the Department of Telecommunications (DoT) in November 1994. The cellular service branded "Max Touch" was launched the same year.

18. (d) To put the web pages on the domain site, we need a connection, a web browser and a web server.

19. (a) Google is a search engine that can be employed to find a variety of information. Others are operating systems.

20. (d) Microsoft Windows is a group of several graphical operating system families, all of which are developed, marketed, and sold by Microsoft. Each family caters to a certain sector of the computing industry.

21. (c) Internet Protocol address (IP address) is a logical numeric address that is assigned to every single computer, printer, switch, router or any other device that is part of a TCP/IP-based network.

22. (b) Gigabyte (GB) is one of the most commonly used units of digital information which is equal to 1,000,000,000 bytes. However, in computer operating science, the value of 1 GB is considered to be equal to 230 or 10243 bytes which is equal to 1,073,741,824 bytes.

23. (a) The binary equivalent of (–15) 10 is 11110001.

24. (b) In both mathematics and computing, hexadecimal (also base 16, or hex) is a positional numeral system with a radix, or base, of 16. It uses sixteen distinct symbols, most often the symbols "0"– "9" to represent values zero to nine, and "A"– "F" (or alternatively "a"– "f") to represent values ten to fifteen.

25. (c) The binary equivalent of (–19)10 in signed magnitude system is 10010011.

26. (a) The octal numeral system, or oct for short, is the base-8 number system, and uses the digits 0 to 7. Octal numerals can be made from binary numerals by grouping consecutive binary digits into groups of three (starting from the right).

27. (c) Hypertext Markup Language is the standard markup language for creating web pages and web applications. On the other hand, Cascading Style Sheets and JavaScript form a triad of cornerstone technologies for the World Wide Web.

28. (c) Audiovisual (AV) means having both sound and visual components and two-way means exchange of information between sender and receiver. Audiovisual service providers frequently offer web streaming, video conferencing and live broadcast services.

29. (d) POP is a protocol used by e-mail clients to download e-mails to your computer.

30. (c) The file extension of MS-Word document in Office 2007 is .docx.

31. (c) A computer virus is a malicious program that self-replicates by copying itself to another program. In other words, the computer virus spreads by itself into other executable code or documents.

32. (c) In computing, virtual memory (also virtual storage) is a memory management technique that provides an "idealized abstraction of the storage resources that are actually available on a given machine" which "creates the illusion to users of a very large (main) memory."

33. (d) Firefox is a Web browser while all others are operating systems.

34. (c) A Webmercial is an online video commercial that promotes a service or product. Each Webmercial is uploaded to your BBCanada.com page and several video websites; YouTube, Dailymotion and Metacafe.

35. (c) An IP address is written in "dotted decimal" notation, which is 4 sets of numbers separated by period each set representing 8-bit number ranging from (0-255). An example of IPv4 address is 216.3.128.12, which is the IP address previously assigned to iplocation.net.

36. (d) The MAC address is a hardware address, which means it is unique to the network card installed on your PC. An Internet Protocol address is a numerical label assigned to each device connected to a computer network that uses the Internet Protocol for communication.

37. (b) The address of the BIOS's memory is located such that it will be executed when the computer is first started up. A jump instruction then directs the processor to start executing code in the BIOS. I know that BIOS lives in non-volatile memory. But it would have to be loaded into the RAM for it to be executed.

38. (c) The first web browser, World Wide Web, was developed in 1990 by Tim Berners-Lee for the NeXT Computer (at the same time as the first web server for the same machine) and introduced to his colleagues at CERN in 1991.

39. (d) Short for graphical user interface, a GUI is an interface that uses icons or other visual indicators to interact with electronic devices, rather than only text via a command line. For example, all versions of Microsoft Windows is a GUI, whereas MS-DOS is a command line.

40. (c) After the appropriate channel or channels are selected, the message enters the decoding stage of the communication process. To decode a photograph, it is useful to follow a methodical process consisting of four stages: describing, analyzing, interpreting and evaluating.

41. (b) The most common image file formats, the most important for cameras, printing, scanning, and internet use, are JPG, TIF, PNG, and GIF. JPG is the most used image file format. JPG is the file extension for JPEG files (Joint Photographic Experts Group, committee of ISO and ITU).

42. (a) Cascading style sheets are used to format the layout of Web pages. They can be used to define text styles, table sizes, and other aspects of Web pages that previously could only be defined in a page's HTML.

43. (d) Google Talk was an instant messaging service that provided both text and voice communication. The instant messaging service is colloquially known as "Gchat", "Gtalk", or "Gmessage" to its users.

44. (a) The term "open source" refers to something people can modify and share because its design is publicly accessible. Open source software is software with source code that anyone can inspect, modify, and enhance. All other major web browsers (Mozilla Firefox, Google Chrome, Opera and Safari are based on open- source components). Presently, Internet Explorer is the only one of the big 5 browsers to remain entirely "closed source."

45. (c) A gigabyte is a unit of data storage capacity that is roughly equivalent to 1 billion bytes. A gigabyte, which uses the abbreviation GB, has been a common unit of capacity measurement for data storage products since the mid-1980s.

46. (d) The Keyboard is an input device. Modem is both input as well as output while keyboard is exclusively input device. An output device is any peripheral that receives data from a computer, usually for display, projection, or physical reproduction.

47. (c) Encoding or scrambling data for transmission across a network is known as Encryption.

48. (c) Open-source software (OSS) is any sort of computer software that's distributed with its source code available for modification. Example: Firefox

49. (a) To 'burn' a CD simply means to copy or write information onto a compact disc, or CD. CD drives that are capable to writing CDs will use a laser to "burn" the information onto the underside of the CD and allow it to be read in CD players or CD-ROM drives.

50. (c) Decimal numbers in binary–
25 = 11001
26 = 11010
27 = 11011
28 = 11100

51. (d) Mail Merge is the process of automatic addition of names and addresses from a database to letters and envelopes in order to facilitate sending mail, especially advertising, to many addresses.

52. (d) All (A), (B) and (C) are the instant messaging apps.

53. (a) Decimal numbers in binary

0	**0**
47	**101111**
48	**110000**
49	**110001**
50	**110011**
51	**110011**

54. (d) Spam email is a form of commercial advertising which is economically viable because email is a very cost-effective medium for the sender. If just a fraction of the recipients of a spam message purchase the advertised product, the spammers are making money and the spam problem is perpetuated.

55. (b) A web browser is a software program that allows a user to locate, access, and display web pages. Browsers are used primarily for displaying and accessing websites on the internet.

56. (b) If one GigaByte is equal to 230 Bytes of data storage, then 1024 TeraBytes is equal to 253 bits of data storage.

57. (b) Blind Carbon Copy means in email is that the users specified in the Bcc : field will get the email and see the addresses in the to : and cc : fields.

58. (c) Mail Merge is most often used to print or email form letters to multiple recipients. Using Mail Merge, you can easily customize form letters for individual recipients. Mail merge is also used to create envelopes or labels in bulk.

59. (b) Web 2.0, also known as Participative [2] (or Participatory) [1] and Social Web[2], refers to World Wide Web websites that emphasize user-generated content, usability (ease of use, even by non-experts), and interoperability (this means that a website can work well with other products, systems, and devices) for end users.

60. (b) The data storage hierarchy consists-Bits, bytes, fields, records, files and databases.

61. (b) "Cc" stands for "Carbon Copy," while "Bcc" stands for "Blind Carbon Copy." All recipients can see the addresses of the main (in 'To' field and Cc'd recipients but not of the Bcc'd recipients. A Bcc'd recipient too cannot see the other Bcc'd recipients' addresses.

62. (c) Laser Printer uses dry ink powder.

63. (c) Internet Explorer, Mozila Firefox and Opera are all web browsers, which are used to locate, retrieve and display content on the World Wide Web, including webpages, images, video and other files.

64. (b) Firewalls can be implemented as both hardware and software, or a combination of both. Network firewalls are frequently used to prevent unauthorized Internet users from accessing private networks connected to the Internet, especially intranets.

65. (a) A computer's internal hard drive is considered a primary storage device, while external hard drive and other external media are considered secondary storage devices. In comparison to secondary storage the primary storage is faster and more expensive.

66. (c)

Data Measurement Chart	
Data Measurement	**Size**
Bit	Single Binary Digit (1 or 0)
Byte	8 bits
Kilobyte (KB)	1,024 Bytes
Megabyte (MB)	1,024 Kilobytes
Gigabyte (GB)	1,024 Megabytes
Terabyte (TB)	1,024 Gigabytes
Petabyte (PB)	1,024 Terabytes
Exabyte (EB)	1,024 Petabytes

67. (b) Volatile memory is computer storage that only maintains its data while the device is powered. Most RAM (random access memory) used for primary storage in personal computers is volatile memory.

68. (d) Solid State Hard Drive

A laptop's weight drops with the replacement of a regular hard drive with faster, smaller, lighter SSD storage. SSD has microchip-based Flash memory and an embedded microprocessor that processes and controls functions. It is more power efficient, too.

Blu-ray is an optical disc format designed to display high definition video and store large amounts of data.

RAM (Random Access Memory) is computer's main memory in the form of computer chips — integrated circuits — that are either soldered directly onto the main logic board of your computer, or installed in memory modules that go in sockets on your computer's logic board. Faster RAM doesn't affect the weight of the laptop.

USB mouse neither affects the speed nor size nor weight of a laptop.

69. (d) $(10001)_2 = 1 \times 2^4 + 0 \times 2^3 + 0 \times 2^2 + 0 \times 0^2 \times 2^1 + 1 \times 2^0$

$= 16 + 0 + 0 + 0 + 1 = 17$

so, $(17)^{10} = (10001)_2$

70. (c) The speed at which a computer performs is one of the key measures of its effectiveness. The speed of a computer depends on a few key factors, RAM is one of them. Random access memory (RAM) has its own megahertz ratings, and more, faster RAM generally makes for a faster computer. RAM comes in "sticks" that are installed on the motherboard.

71. (c) Bcc in e-mails stands for 'Blind carbon copy'. When a message is blind carbon copied, neither the main recipient nor the Bcc recipients can see the addresses in the "Bcc:" field. it is a useful way to let others see an e-mail you sent without the main recipient knowing.

72. (d) Shareware is a type of software that is distributed free of charge to prospective customers in a limited format. A full software version is distributed for a trial period (usually 30 days), or a trial version is distributed with disabled features.

73. (b) The acronym 'WYSIWYG' in internet technology stands for 'What You See Is What You Get'. WYSIWYG is used to refer to computer editing systems that make it as easy as possible for users to create and edit documents, presentations and other types of digital works. A WYSIWYG editor accomplishes this by providing users with an interface that allows them to visually see what their final result would look like as they create it or make changes to it.

74. (c) Bcc in e-mails stands for 'Blind carbon copy'. It is functionality available in most email programs through which the sender can distribute an email to one or more individuals beyond the ones to whom the email is addressed. Unlike simple carbon (Cc) copy, blind carbon copy is said to be blind because it sends a copy of the email in transit to the defined email address(s) without letting any of the recipients know about it.

75. (d) Proprietary software, also known as closed-source software, is a non-free computer software for which the software's publisher or another person retains intellectual property rights—usually copyright of the

source code, but sometimes patent rights. Examples of proprietary software include Microsoft Windows, Adobe Flash Player, PS3 OS, iTunes, Adobe Photoshop, Google Earth, mac OS (formerly Mac OS X and OS X), Skype, WinRAR, Oracle's version of Java and some versions of Unix.

76. (a) Spyware is a software that "spies" on any computer. It can capture information like Web browsing habits, e-mail messages, usernames and passwords, and credit card information without the knowledge of the user. If left unchecked, the software can transmit this data to another person's computer over the Internet.

77. (a) A computer worm is self-replicating malware that duplicates itself to spread to uninfected computers. Worms often use parts of an operating system that are automatic and invisible to the user.

78. (a) In binary system 1100110 can be written as:
$0+ 1\times2^1 +1 \times 2^2 + 0 + 0 +1 \times 2^5+1\times2^6$
Or $0 + 2 + 4 + 0 + 0 + 32 + 64 = 102$

79. (d) The binary equivalent of decimal number 75 is;

2	75	1
2	37	1
2	18	0
2	9	1
2	4	0
2	2	0
	1	

1001011

80. (a) Bluetooth is a wireless technology standard for exchanging data between fixed and mobile devices over short distances using short-wavelength UHF radio waves in the industrial, scientific and medical radio bands, from 2.400 to 2.485 GHz, and building personal area networks (PANs). It was originally conceived as a wireless alternative to RS-232 data cables.

81. (d) A logic bomb is a piece of code intentionally inserted into a software system that will set off a malicious function when specified conditions are met. For example, a programmer may hide a piece of code that starts deleting files, should they ever be terminated from the company.

82. (a) A CD-ROM is a pre-pressed optical compact disc that contains data. Computers can read—but not write to or erase. It has the capacity of 194 MiB (8 cm), 650–900 MiB (12 cm). A read-only DVD disc used to permanently store data files. It has the storage capacity of 4.7 GB (single-sided, single-layer – common) 8.5 GB (single-sided, double-layer) 9.4 GB (double-sided, single-layer) 17.08 GB (double-sided, double-layer).

Blu-ray or Blu-ray Disc (BD) is a digital optical disc data storage format. It was designed to supersede the DVD format, and is capable of storing several hours of video in high-definition (HDTV 720p and 1080p) and ultra high-definition resolution (2160p).

83. (b) In Audio and Video compression, RGB is an additive color, meaning that Red, Green and Blue all have a luminance value built in, and a combination of different variations of Red, Green, Blue at different brightness will produce different colors.

84. (c) The terabyte is the current heavyweight of all data storage. One Terabyte (TB) of memory is equal to $1024 \times 1024 \times 1024$ KB.

85. (c) Primary sources are documents, images or artefacts that provide firsthand testimony or direct evidence concerning a historical topic under research investigation. Primary sources include historical and legal documents, eyewitness accounts, interviews, surveys, fieldwork, collective questionnaire, email communication. In the natural and social sciences, primary sources are often empirical research in which an experiment is performed or a direct observation is made; its results being typically included in the report.

86. (a) Binary describes a numbering scheme in which there are only two possible values for each digit: 0 and 1. The term also refers to any digital encoding/decoding system in which there are exactly two possible states. In digital data memory, storage, processing, and communications, the 0 and 1 values are sometimes called "low" and "high," respectively. A single binary digit (like "0" or "1") is called a "bit". The word **bit** is made up from the words «**b**inary dig**it**".

87. (c) Joint photographic experts (JPEG) group is the first international standard in image compression. It is widely used today. JPEG is a popular image file format. It is commonly used by digital cameras to store photos since it supports 2^{24} or 16,777,216 colors. The 16 million possible colors in a JPEG image are produced by using 8 bits for each color (red, green, and blue) in the RGB color space. This provides 2^8 or 256 values for each of the three colors, which combined allow for $256 \times 256 \times 256$ or 16,777,216 colors.

88. (a) **CPU** is the abbreviation for *central processing unit*. The CPU is the brains of the computer where most calculations take place. In terms of computing power, the CPU is the most important element of a computer system. Central processing units have two primary components;

(i) The arithmetic logic unit (ALU) is the CPU component that performs the processor's actual computations. Its circuitry calculates the addition, subtraction, multiplication and division equations in the instructions the control unit passes to it. The ALU also performs logical operations that are essential to the control structures that regulate software flow.

(ii) The control unit (CU*)* regulates the processor's operation and the arithmetic logic unit that actually crunches numbers and compares values. However, these two clusters of transistors still rely on memory resources in the computer the CPU powers in order to function.

89. (c) The *main memory* in a *computer is called* Random Access *Memory (RAM)*. This is the part of the *computer* that stores operating *system* software,

software applications and other information for the central processing unit (CPU) to have fast and direct access when needed to perform tasks. **Kilobyte (KB)** is a common measurement unit of digital information. In practical information technology, KB is actually equal to 210 bytes, which makes it equal to 1024 bytes. Therefore 960 Kbytes will be equal to 960 × 1024 bytes.

90. (c) An address book is a database that stores names, addresses and other contact information for a computer user. It allows easy access to the user's friends, family, business associates and others by maintaining their email and other contact details on their computer.

91. (d) A modem is a hardware networking device that converts data to a signal so it can be easily sent and received over a phone line, cable, or satellite connection.

92. (c) Snail Mail is sent through the post office where as electronic mail (email or e-mail) is a method of exchanging messages between people using electronic devices. Snail Mail is a slang term for the regular postal service and is very slower than e-mail.

93. (a) *Ethernet* is the traditional technology for connecting wired local area networks (LANs), enabling devices to communicate with each other via a protocol -- a set of rules or common network language.

Token ring is a communication protocol in a local area network (LAN) where all stations are connected in a ring topology and pass one or more tokens for channel acquisition.

Fiber Distributed Data Interface (*FDDI*) is a standard for data transmission in a local area network.

94. (b) Whenever we save any program into a file, it automatically gets stored in the secondary storage i.e. the hard disk. And when we run program, it is loaded into the main/primary memory of the computer called RAM. The program instructions are executed in the ALU (Arithmetic-Logic Unit) of the CPU. Therefore (a) is not a correct option.

95. (a) Protocol, domain name of the host,

Path/file are the lists of the components of a cyber space address (URL) in the correct order from beginning to end.

96. (b) In 1989 the world wide web was invented by the British Scientist, Sir Tim Berners-Lee. It was developed by him to fulfil the need of automated information sharing between scientists across the world. World Wide Web is a collection of websites or web pages stored in web servers and connected to local computers through the internet. These websites contain text pages, digital images, audios, videos, etc. The WWW, along with internet, enables the retrieval and display of text and media to your device.

97. (a) Reading data from the RAM is much faster than reading data from the hard drive. RAM can be accessed hundreds of times times faster than a hard drive.

In mathematics and computing, *hexadecimal* is a positional system that represents numbers using a base of 16. Decimal comes from the Latin word decimus, meaning tenth, from the root word decem, or 10. The decimal system, therefore, has 10 as its base and is sometimes called a base-10 system. 99 hexadecimal is equal to 153 decimal.

98. (c) There was once upon a time when CPU clock speed increased dramatically from year to year. In the 90s and early 2000s processors increased at incredible speeds, shooting from 60 MHz Pentium chips to gigahertz-level processors within a decade. But around 2005, the top CPU clock speed of the high-end processors settled around 4 GHz and hasn't increased much since then. Now greater improvements in power come from multi-core processor designs. As a result, we see chips like AMD's recent offerings, with a dramatically increased number of cores. These modern transistors and Chips have increased the power of processors. Thus CPU clock speed need not to increase.

99. (c) Information technology is the study, design, development, implementation, support or management of computer-based information systems—particularly software applications and computer hardware. However Security threats and Privacy concerns are major issues that arise out of growing information technology.

100. (a) Clock speed is the rate at which a processor can complete a processing cycle.CPU clock speed, or clock rate, is measured in Hertz — generally in gigahertz, or GHz. In most cases, Bluetooth devices consume less power than WiFi. Bluetooth Low Energy (BLE) is specifically designed to have low energy consumption.

101. (d) Midi, wav, wma, mp3

102. (c) A local-area network (LAN) is a computer network that spans a relatively small area. Most often, a LAN is confined to a single room (with any brand of computer), building or group of buildings; however, one LAN can be connected to other LANs over any distance via telephone lines and radio waves. The acronym ISP is 'Internet service provider '. It provides services for accessing, using, or participating in the Internet.

103. (b) A *computer virus* is a type of malicious code or program written to alter the way a *computer* operates and is designed to spread from one *computer* to another. A *virus* operates by inserting or attaching itself to a legitimate program or document that supports macros in order to execute its code.

104. (d) Yahoo is an American web services provider while internet Explorer, Mozilla Firefox and Google Chrome are web browsers.

105 (d) A web page or webpage is a document commonly written in HTML (Hypertext Markup Language) that is accessible through the Internet or other networks using an Internet browser. A web page is accessed by entering a URL address and may contain text, graphics, and hyperlinks to other web pages and files.

106. (d) A search engine is a web-based tool that enables users to locate information on the World Wide Web. Popular examples of search engines are Google, Yahoo!, and

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MSN search. It utilizes automated software applications (referred to as robots, bots, or spiders) that travel along the Web, following links from page to page, site to site.

107. (b) Word processing software offers a variety of features and commands that enable users to create attractive business documents easily and efficiently. Changing the appearance of a document in word processor is known as Formatting. Formatting features include aligning text vertically and horizontally, indenting and hyphenating text, and changing margins and line spacing.

108. (d) Optical storage is any storage type in which data is written and read with a laser. Typically, data is written to optical media, such as compact discs (CDs) and DVDs. The most common example of the storage medium is the CD, DVD, and Blu-ray discs. CD-ROM, DVD-ROM, are read only optical Discs. Blu-Ray, HD-DVD are high capacity optical Discs while CD-R & DVD-R are recordable optical discs and CD-RW & DVD-RW are re writable optical discs.

109. (d) Monitor and Printer is an output devices whereas Joystick, Keyboard, Mouse and Digitiser are input devices.

110. (b) Creating text files and using a word processor is one of the most common tasks on a computer. .doc and .docx, .odt, .pdf, .rtf, .tex and Csv are exclusively text file format.

111.(c) An operating system (OS) is software which acts as an interface between the end user and computer hardware. Every computer must have at least one OS to run other programs.

112. (c) A. $0111 \rightarrow 1 + 2^1 + 2^2 = 1 + 6 = 7$

$1001 \rightarrow 1 + 0 + 0 + 2^3 = 1 + 8 = 9$

$1011 \rightarrow 1 + 2^1 + 0 + 2^3 = 1 + 2 + 8 = 11$

$P = 1101 \rightarrow 1 + 0 + 2^2 + 2^3 = 1 + 4 + 8 = 13$

B. 1 byte = 8 bit

Hence both (a) and (b) are correct.

113. (b) Phishing is the fraudulent attempt to obtain sensitive information such as user names, passwords and credit card details by disguising oneself as a trustworthy entity in a electronic communication.

114. (d) As per the Oxford Dictionary, 'subtext' is an underlying and often distinct theme in a piece of writing or conversation.

It is not stated explicitly by any character or the author, but is implicit and understood by the observer/reader. Subtext can also refer to the thoughts and motives of the characters which are only covered in an aside.

115. (c) A communication without expecting an immediate response is called asynchronous communication. Some examples of asynchronous communication are file transfer, email, Forums and the World Wide Web.

116. (b) VOIP is an acronym for Voice over Internet Protocol, or in more common terms phone service over the Internet. Fibre-optic cable makes use of light pulses to transmit data. URL is the abbreviation of Uniform Resource Locator and is defined as the global address of documents and other resources on the World Wide Web. Unshielded Twisted Pair (UTP) cable is used not only for networking but also for the traditional telephone (UTP-Cat 1).

117. (c) (i) $50 = 32 + 16 + 2$

$= 1 \times 2^5 + 1 \times 2^4 + 1 \times 2^1$

$\therefore (50)_{10} = (0110010)_2$

(ii) $(102) = 64 + 32 + 4 + 2$

$= 1 \times 2^6 + 1 \times 2^5 + 1 \times 2^2 + 1 \times 2^1$

$\therefore (102)_{10} = (01100110)_2$

(iii) Synchronous communication are synchronised by an external clock, examples real-time video conferencing.

(iv) A synchrondes communication are synchronized by special signal along the transmission line, example is SMS texting.

118. (b) Geographical information System (GIS) is a computer based system that stores and, manipulates data that are viewed from a geographical point or reference. A geographic information system (GIS) is a framework for gathering, managing, and analyzing data.

119. (b) A vacuum tube computer, now termed a first-generation computer, is a computer which uses vacuum tubes for logic circuitry. A second generation computer which is also called transistor computer is a computer which uses discrete transistors instead of vacuum tubes. The *computers* of *third generation* used Integrated Circuits (ICs) in place of transistors. A single IC has many transistors, resistors, and capacitors along with the associated circuitry. The period of fourth generation was from 1971-1980. Computers of fourth generation used Very Large Scale Integrated (VLSI) circuits. VLSI circuits have about 5000 transistors.

120. (a) Storage devices (also known as secondary devices) are used to store programs and information. Hard disk, Floppy disk, USB Flash Drives, CD-ROM, and DVD are some examples of storage devices. Cd, dvd, flash drives , hard disk devices are in ascending order of storage capacity in computer.

121. (a) The number of bits in a processor refers to the size of the data types that it handles and the size of its registry. Binary number system is generally followed in a typical 32-bit computer.

122. (d) Human communication is the basic example of interactive communication which involves two different processes; human to human interactivity and human to computer interactivity. Human-Human interactivity is the communication between people.

CHAPTER 35

Digital Initiatives in Higher Education

Digital revolution is bringing in sweeping changes in the Higher Education landscape. Every institute is taking various initiatives in promoting digital education. The technology of online education and all the digital initiatives have the possibility to revolutionize higher education scenario in the near future.

Department of Higher Education, Ministry of Human Resource Development is administering a programme 'National Mission on Education through Information and Communication Technology' (NMEICT) to leverage the potential of ICT to make the best quality content accessible to all learners in the country, free of cost.

The various initiatives under this programme are as under:

1. SWAYAM -STUDY WEBS OF ACTIVE LEARNING FOR YOUNG ASPIRING MINDS

The 'Study Webs of Active Learning for Young Aspiring Minds' (SWAYAM) is an integrated platform for offering online courses covering school (9^{th} to 12^{th}) to Post Graduate Level. SWAYAM is a programme initiated by Government of India and designed to achieve the three cardinal principles of Education Policy viz., access, equity and quality. The objective of this effort is to take the best teaching learning resources to all, including the most disadvantaged. SWAYAM seeks to bridge the digital divide for students who have hitherto remained untouched by the digital revolution and have not been able to join the mainstream of the knowledge economy.

2. SWAYAM PRABHA: THE 32 EDUCATIONAL DTH CHANNELS

The SWAYAM PRABHA has been conceived as the project for telecasting high quality educational programmes through 32 DTH channels on 24×7 basis.

3. NATIONAL DIGITAL LIBRARY (NDL)

National Digital Library in India aims to collect, preserve and disseminate entire intellectual output of our country and provide online access from school level to post graduate level, including technical education.

4. NATIONAL ACADEMIC DEPOSITORY (NAD)

- National Academic Depository (NAD) facilitates digital issuance, storage, access and verification of Academic Awards issued by Academic Institutions.

5. e-SHODH SINDHU

Based on the recommendation of an Expert Committee, the MHRD has formed e-Shodh Sindhu merging three consortia initiatives, namely UGC-INFONET Digital Library Consortium, NLIST and INDEST-AICTE Consortium. The e-Shodh Sindhu will continue to provide current as well as archival access to more than 15,000 core and peer-reviewed journals and a number of bibliographic, citation and factual databases in different disciplines from a large number of publishers and aggregators to its member institutions including centrally-funded technical institutions, universities and colleges that are covered under 12(B) and 2(f) Sections of the UGC Act.

This allows access to be best education resources in the world using digital mode.

The INFLIBNET, Gandhinagar, Gujarat is implementing the Scheme.

6. VIRTUAL LABS

Internet-based experimentation further permits use of resources – knowledge, software, and data available on the web, apart from encouraging skillful experiments being simultaneously performed at points separated in space (and possibly, time).

7. e-YANTRA

- An MHRD initiative under NMEICT Programme, named "e-Yantra" is implemented to incorporate Robotics into engineering education with the objective of engaging students through exciting hands-on application of mathematics, computer science, and engineering principles.

8. CAMPUS CONNECTIVITY

- Establishment of GBPS Connectivity to universities and 20 512 Kbps broadband connectivity to colleges have been provisioned under NMEICT.

9. E-KALPA For creating Digital-Learning Environment for Design in India.

10. THE FREE AND OPEN SOURCE SOFTWARE FOR EDUCATION (FOSSEE)

Promotes use of open source software in educational institutions (http://fossee.in). It does through instructional material, such as spoken tutorials, documentation, such as textbook companions, awareness programmes, such as conferences, training workshops, and Internships.

11. e-VIDWAN

- Collects and provides academic and research profiles of scientists, faculty and research scientists working in leading academic and R&D organizations in India and abroad;

12. CENTRAL CLOUD INFRASTRUCTURE

Of the IIT Delhi cloud is hosting e-content and video content of e-Acharya.

13. GLOBAL INITIATIVE FOR ACADEMIC NETWORK (GIAN)

- Connects the Indian academia with the international talent pool of scientists and entrepreneurs by inviting them to teach and participate in research in Indian HEIs.

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14. SCHEME FOR ACADEMIC RESEARCH AND PROMOTION BY COLLABORATION (SPARC)

- Facilitates academic and research collaborations between Indian academia and best institutions in the world.

15. DIGITAL INDIA-e-LEARNING

- The main objective of this virtual classroom initiative is to enable millions of youth outside the university campus to access best quality teachers and teaching courses in an easy paced manner without having to pay large admission/ tuition fees or even qualify through JEE or other entrance examinations.
- MOOCs will allow limited interaction with faculty, take examinations and even earn certificates that may help in getting employment.

16. IMPRINT

The Government of India, in order to promote the culture of innovation in India, particularly in the technology institutions like IITs, NITs and all other HEIs, recently formulated a new and unique scheme called Impacting Research Innovation and Technology (IMPRINT), primarily with the goal of translation of knowledge from research into viable technology (product or process).

17. SAKSHAT: A ONE STOP EDUCATION PORTAL

- The educational centent portal, developed by eGyanKosh of IGNOU, was launched by the then President of India Dr. APJ Abdul Kalam on 30 October 2006, to facilitate lifelong learning for students, teachers and those in employment or in pursuit of knowledge free of cost to them.

18. ATAL RANKING OF INSTITUTIONS ON INNOVATION ACHIEVEMENTS (ARIIA)

- systematically ranks all major higher educational institutions and universities in India on indicators related to "Innovation and Entrepreneurship Development" amongst students and faculties.

19. OSCAR (OPEN SOURCE COURSEWARE ANIMATIONS REPOSITORY)

Provides a repository of web-based interactive animations and simulations that we refer to as learning objects (LOs). These learning objects span topics in science and engineering at the college level, and math and science at the school level.

20. SHODH GANGOTRI

- Under the initiative called "Shodh Gangotri", research scholars / research supervisors in universities are requested to deposit electronic version of approved synopsis submitted by research scholars to the universities for registering themselves for the Ph.D programme.

21. SOS TOOLS

Software and simulation (SOS)packages are useful tools for the analysis of systems and solving problems by the students of Science, Social Science, Engineering, Management and related disciplines. Many commercial software packages are available for the above. But many of these software packages are quite costly and require yearly license fee for updates and maintenance. Many open source software are available which can perform similar functions but are not user friendly and do not have proper documentation. Beside these, adequate manpower to teach students to use these packages are not available.

The objective of this project is to develop software tools for analysis of systems and computations, create adequate manpower to teach students to use open source software and to develop simulation tools. The developed software should be user friendly and properly documented. Such packages, tailored to suit the needs of our students will be ported on Sakshat for making freely available to any student, teacher or institution willing to use them.

22. E-PG PATHSHALA

High quality, curriculum-based, interactive e-content in 70 subjects across all disciplines of social sciences, arts, fine arts and humanities, natural & mathematical sciences, linguistics and languages developed by the subject experts working in Indian universities and other R & D institutes across the country.

EXERCISE

1. The concept of connect intelligence is derived from: **[June-2006]**
(a) virtual reality (b) fuzzy logic
(c) Bluetooth technology (d) value added networks

2. Use of an ordinary telephone as an Internet applicance is called: **[June-2006]**
(a) voice net (b) voice telephone
(c) voice line (d) voice portal

3. Which of the following is not a Computer language? **[June-2008]**
(a) PASCAL (b) UNIX
(c) FORTRAN (d) COBOL

4. Corel Draw is a popular: **[June-2008]**
(a) Illustration programme (b) Programming language
(c) Text programme (d) None of these

5. Which one of the following is not an Internet Service Provider (ISP) ? **[December-2010]**
(a) MTNL (b) BSNL
(c) ERNET India (d) Infotech India Ltd.

6. Which of the following is type of LAN ? **[June-2011]**
(a) Ethernet (b) Token Ring
(c) FDDI (d) All of the above

7. High level programming language can be converted to machine language using which of the following ? **[December-2011]**
(a) Oracle (b) Compiler
(c) Mat lab (d) Assembler

8. Symbols A-F are used in which one of the following ? **[December-2014]**
(a) Binary number system
(b) Decimal number system
(c) Hexadecimal number system
(d) Octal number system

9. Which of the following statements regarding the features of Information and Communication Technology (ICT) is/ are true? **[August-2016]**
I. ICT are the main instruments for the creation of computer networks and the applications based on them.
II. ICT support the spread of information and knowledge, separating the content from the place where it belongs physically.
III. The digital and virtual nature of most of ICT products allow the expenditure for them to be maximized.
Codes :
(a) I and II only (b) I and III only
(c) II and III only (d) I, II and III

10. A group's access to digital technology and another group's lack of access to it, will cause a disparity known as: **[20th June 2019-Ist Shift]**
(a) Internet inequality
(b) Web inequality
(c) Technological imbalance
(d) Digital divide

11. Which one of the following is an educational FM radio network? **[20th June 2019-Ist Shift]**
(a) Gyan Darshan (b) Gyan Vani
(c) Gyan Dhara (d) GIAN

12. Which of the following best describes a wiki? **[21st June 2019-Ist Shift]**
(a) A system that allows users to add information onto a website but does not change andy pre-existing information.
(b) A system that allows collaborative modification of its content and structure directly from the web browser.
(c) A system that serves as a publically personal journal for an individual.
(d) A system that monitors the modification of content within a blog.

13. Which of the following terms is related to the digital learning environment for design? **[3rd Dec. 2019-Ist Shift]**
(a) e-Vidwan (b) e-Acharya
(c) e-Kalpa (d) e-Yantra

14. The purpose of ICT use in education is to **[3rd Dec. 2019-Ist Shift]**
(a) attract students
(b) make teaching interesting
(c) optimise learning outcomes
(d) promote technology culture in teaching

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HINTS & EXPLANATION

1. **(d)** A value-added network (VAN) is a private network provider (sometimes called a turnkey communications line) that is hired by a company to facilitate electronic data interchange (EDI) or provide other network services.

2. **(c)** A voice line is a low-cost phone service that is an alternative to your traditional phone line. With a telephone, broadband Internet connection and a telephone adapter, VoiceLine allows you to make and receive calls at home or anywhere in the world.

3. **(b)** Unix is an operating system which gives 'life' to computer.

4. **(a)** Corel Draw is a popular illustration programme from Corel, mainly used to create varied types of documents ranging from visiting cards to big hoardings.

5. **(d)** The ITC Infotech India Ltd. delivers business consulting, customer relationship management, data warehousing, enterprise resource planning, mainframe services, quality assurance, and testing.

6. **(d)** There are different types of Media Access Control methods in a LAN, they include Ethernet, Token Ring, FDDI (Fiber Distributed Data Interface), etc.

7. **(b)** A compiler is a program that converts instructions into a machine-code or lower-level form so that they can be read and executed by a computer. Compilers are a type of translator that support digital devices, primarily computers.

8. **(c)** In mathematics and computing, hexadecimal (also base 16, or hex) is a positional numeral system with a radix, or base, of 16. It uses sixteen distinctsymbols, most often the symbols 0-9 to represent values zero to nine, and A-F (or alternatively a-f) to represent values ten to fifteen.

Symbols A–Fare used in Hexadecimal number system

Symbol	Decimal value
A	10
B	11
C	12
D	13
E	14
F	15

9. **(a)** ICT is the main instrument for the creation of computer networks and the applications based on them. It also supports the spread of information and knowledge, separating the content from the place where it belongs physically.

10. **(d)** The Digital Divide refers to the inequalities between people who have access to and the resources to use modern information and communication technology (ICT), such as desktop computers and the Internet, and people who do not.

11. **(b)** IGNOU's radio channel Gyan Vani (GV) was conceived in 2001 as a network of educational FM Radio Channels operating from various cities in the country. With an aim to enhance and supplement the teaching-learning process, each GV Station has a range of about 60 kms and covers an entire city/town including the adjoining rural areas.

12. **(b)** The term comes from the word "wikiwiki," which means "fast" in the Hawaiian language. A *wiki* is a knowledge base website on which users collaboratively modify content and structure directly from the web browser.

13. **(c)**

14. **(c)** Information and Communication Technology (ICT) is used in education to support, enhance, and optimise the delivery of information. Worldwide research has shown that ICT can lead to an improved student learning and better teaching methods.

CHAPTER 36

ICT and Governance

Governance has been defined to refer to structures and processes that are designed to ensure accountability, transparency, responsiveness, rule of law, stability, equity and inclusiveness, empowerment, and broad-based participation. Governance also represents the norms, values and rules of the game through which public affairs are managed in a manner that is transparent, participatory, inclusive and responsive.

Good Governance

Good governance has 8 major characteristics.

e-Governance

Through Technology

The guiding principles for reforming Government through technology are:

- Form simplification and field reduction – Forms should be made simple and user friendly and only minimum and necessary information should be collected.
- Online applications and tracking - Online applications and tracking of their status should be provided.
- Online repositories - Use of online repositories e.g. for certificates, educational degrees, identity documents, etc. should be mandated so that citizens are not required to submit these documents in physical form.
- Integration of services and platforms – Integration of services and platforms e.g. Aadhaar platform of Unique Identity Authority of India (UIDAI), payment gateway, Mobile Seva platform, sharing of data through open Application Programming Interfaces (API) and middleware such as National and State Service Delivery Gateways (NSDG/SSDG) should be mandated to facilitate integrated and interoperable service delivery to citizens and businesses.

OBJECTIVES/ADVANTAGES OF E-GOVERNANCE

(i) To build an informed society by providing access to every piece of information of the Government and of public importance.

(ii) To increase Government and Citizen Interaction through a feedback framework, to know people's problems and to find solutions with their active involvement.

(iii) To encourage democracy participation in the Governing process, through feedback, access to information and citizens participation in decision making.

(iv) To bring transparency in the governing process by making all the information, decisions, and policies of the Government accessible to people.

(v) To make the Government accountable through transparency in governance help the Government to be more

(vi) To reduce the cost of Governance by cutting down expenditure on physical delivery of information and services, particularly stationary,

(vii) To reduce the reaction time of the Government as red-tapism of physical files gets eliminated.

(viii) To speed up delivery of services as technology (Internet, smart phones) make communication speedier.

EMERGING AREAS FOR e-GOVERNANCE

Technology for Education – e-Education	This refers to broadband and wi-fi connectivity to Schools, digital literacy program at the national level and leveraging Massive Online Open Courses (MOOCs).
Technology for Health – e-Healthcare	This refers to use of technology for better healthcare service delivery that includes online medical consultation, online medical records, online medicine supply, pan-India exchange for patient information, etc.
Technology for Farmers	This would facilitate farmers to get real time price information, online ordering of inputs and online cash, loan, and relief payment with mobile banking.
Technology for Security	This refers to provisioning off Mobile based emergency services and disaster related services to citizens on real time basis so that they can take precautionary measures well in time and minimize loss of lives and properties.
Technology for Justice	Interoperable Criminal Justice System shall be strengthened by leveraging several related applications, i.e. e-Courts, e-Police, e-Jails and e-Prosecution.

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Technology for Financial Inclusion	Financial inclusion shall be strengthened using mobile banking, Micro-ATM program and CSCs/ Post Offices.
Technology for Cyber Security	National Cyber Security Co-ordination Centre would be set up to ensure safe and secure cyber-space within the country.

THE FOUR PILLARS OF e-GOVERNANCE

1. Government to Citizen (G2C)
2. Citizen to Government (C2G)
3. Government to Government (G2G)
4. Government to Business (G2B)

1. Government to Citizen

E-Citizenship: facilitation of Government Services relating to citizenship of an individual.
E-transportation: services of Government, relating to Transport by Road, Rail, Water or Air.
E-Health: health services of the Government, interconnection of all hospitals.
E-Education: Distant as well as classroom education.
E-Help: facilitation of disaster and crisis management using ICT.
E-Taxation: tax due alerts and online payment of taxes.

2. Citizen to Government

E-Democracy: The ICT can help to enable the true democratic process including voting, public opinion, feedback and Government accountability.
E-Feedback: ICT enabled online feedback to the Government, online debates on Government services.

3. Government to Government

E-Administration
E-Police
E-Courts

4. Government to Business

E-Taxation
E-Licensing
E-Tendering

THE NATIONAL e-GOVERNANCE PLAN (NeGP)

The National e-Governance Plan (NeGP) as the enabler of Digital India programme was conceptualized to focus on e-Governance initiatives at the national level its aim was to "Make all Government services accessible to the common man in his locality, through common service delivery outlets, and ensure efficiency, transparency, and reliability of such services at affordable costs to realise the basic needs of the common man". The strategy adopted was centralized planning and decentralized planning. The Government initially approved the National e-Governance Plan (NeGP), comprising of 27 Mission Mode Projects (MMPs) and 8 components, on May 18, 2006. 4 more mission mode projects namely 'Education', 'Health', 'Posts' and 'Public Distribution System' were added to NeGP portfolio in 2011. As part of NeGP, core ICT infrastructure has been created by MeitY. (Ministry of Electronics and Information Technology)

E-KRANTI : NeGP 2.0

It has the vision and mission of electronic delivery of all services in the best manner possible.

The Key Principles of e-Kranti

1. Transformation and not Translation
2. Integrated Services and not Individual Services
3. Government Process Reengineering (GPR) to be mandatory in every MMP
4. ICT Infrastructure on Demand
5. Cloud by Default
6. Mobile First
7. Fast Tracking Approvals
8. Mandating Standards and Protocols
9. Language Localization
10. National GIS (Geo-Spatial Information System)
11. Security and Electronic Data Preservation

DIGITAL INDIA INITIATIVE

Enabled by National e-Governance Plan (NeGP) and e-Krantis NeG P 2.0, the Digital India Initiative aims to completely digitise all aspects of governance as well as citizens lives.

The vision areas of Digital India

I. Infrastructure as Utility to Every Citizen
II. Governance and Services on Demand
III. Digital Empowerment of Citizens

Nine Pillars of Digital India

1. Broadband Highway
2. Universal access to mobile
3. Public Internet Access Programme (PIAP)
4. E-governance
5. E-kranti
6. Information for all
7. Electronics manufacturing
8. IT for jobs
9. Early harvest programmes

EXERCISE

1. Conferences are meant for **[June-2012]**
(a) Multiple target groups
(b) Group discussions
(c) Show-casing new Research
(d) All the above

2. As Chairman of an independent commission on education, Jacques Delors report to UNESCO was titled : **[December-2015]**
(a) International Commission on Education Report
(b) Millennium Development Report
(c) Learning : The Treasure Within
(d) World Declaration on Education for All

3. Read the following two statements :
I : Information and Communication Technology (ICT) is considered a subset of Information Technology (IT).
II : The 'right to use' a piece of software is termed as copyright. Which of the above statement(s) is/are CORRECT? **[January-2017]**
(a) Both I and II (b) Neither I nor II
(c) II only (d) I only

4. Which of the following statements(s) is/are True respect to ICT? **[21st June 2019-Ist Shift]**
P : ICT is an acronym that stands for information and competitive technology.
Q : The effective use of ICT to support learning in the inclusive education exemplifies good teaching for all learners.
(a) P only (b) Q only
(c) Both P and Q (d) Neither P nor Q

5. You need to use automatic calculations in preparing a budget. Which software application should be used? **[21st June 2019-IInd Shift]**
(a) Spreadsheet (b) Presentation
(c) Word processing (d) Desktop publishing

6. The use of Information Technology (IT) to improve the ability of Government to address the needs of society is known as _____. [25th June 2019-I Shift]
(a) E - Business (b) E - Administration
(c) E - Governance (d) E - Marketing

7. Which of the following mobile payment application is developed by the National Payments Corporation of India based on UPI? **[25th June 2019-IInd Shift]**
(a) MYGOV (b) BHIM
(c) UMANG (d) PhonePe

8. Identify the encompassing term that involves the use of electronic platforms to conduct a company's business. **[26th June 2019-IInd Shift]**
(a) E-Business (b) E-Commerce
(c) E-Marketing (d) E-Governance

9. Given below are two statements – one is labelled as Assertion (A) and the other as Reason (R) : **[3rd Dec. 2019-Ist Shift]**
Assertion (A) : Sniffing may be used to steal data or information over a network.
Reason (R) : Sniffing is a process of monitoring and capturing all data packets passing through given network.
In the light of the above stated two statements, Choose the correct option from the choices given below :
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(c) (A) is true, but (R) is false
(d) (A) is false, but (R) is true

10. The national agency for responding to computer security incidents as and when they occur, is **[4th Dec. 2019-Ist Shift]**
(a) CAT (b) CDAC
(c) CCA (d) ICERT

11. Given below are two statements — one labelled as Assertion (A) and the other labelled as Reason (R). **[5th Dec. 2019-Ist Shift]**
Assertion (A): Information Technology is fast becoming a very important field of activity in India.
Reason (R): Software is one of the major exports of India and further India has a very strong base in hardware. In the light of the above two statements, choose the correct option :
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(c) (A) is true, but (R) is false
(d) (A) is false, but (R) is true

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HINTS & EXPLANATION

1. **(d)** All the above

A conference is a formal meeting of researchers with a shared interest organised with the purpose of providing them a forum to present and discuss their work and exchange information and innovative ideas. It is typically spread over several days.

2. **(c)** Learning: The Treasure Within

The Delors Report was a report created by the Delors Commission in 1996. It proposed an integrated vision of education based on two key concepts, 'learning throughout life' and the four pillars of learning,—to know, to do, to be and to live together.

3. **(c)** The key difference is that IT is a subset of ICT. A software license is a legal instrument governing the use or redistribution of software.

4. **(b)** ICT Stands for "Information and Communication Technologies." ICT refers to technologies that provide access to information through telecommunications. It is similar to Information Technology (IT), but focuses primarily on communication technologies. This includes the Internet, wireless networks, cell phones, and other communication mediums.

5. **(a)** A *spreadsheet* is an interactive computer application for organization, analysis and storage of data in tabular form. Spreadsheets developed as computerized analogs of paper accounting worksheets. The program operates on data entered in cells of a table. Each cell may contain either numeric or text data, or the results of formulas that automatically calculate and display a value based on the contents of other cells. A spreadsheet may also refer to one such electronic document. Spreadsheet users can adjust any stored value and observe the effects on calculated values.

6. **(c)** E-governance is the integration of **Information and Communication Technology (ICT)** in all the processes, with the aim of enhancing government ability to address the needs of the general public. It makes the whole administrative process convenient, efficient, transparent, fully accountable and responsible. The basic purpose of e-governance is to simplify processes for all, i.e. government, citizens, businesses, etc. at National, State and local levels.

7. **(b)** To make the country a cashless economy, the Govt. has launched a mobile payment app named BHIM (Bharat Interface for Mobile). This application will be common across all banks and financial institutions.

8. **(a)** E-commerce refers to buying and selling online, while e-business encompasses all business conducted online. E-commerce can be viewed as a subset of e-business.

9. **(a)** Sniffing is a process of monitoring and capturing all data packets passing through given network. Sniffers are used by network/system administrator to monitor and troubleshoot network traffic. Sniffing technique is used by network professionals to diagnose network issues, and by malicious users to capture unencrypted data, like passwords and usernames.

10. **(d)** ICERT is the national nodal agency for responding to computer security incidents as and when they occur. In the recent Information Technology Amendment Act 2008, it has been designated to serve as the national agency to perform the functions in the area of cyber security. ICERT is operational since 2004.

11. **(c)** According to Reserve Bank of India data the rate of growth of the combined exports of software and IT-enabled services has fallen from 20.8 % in 2012-13 to 14.9 % in 2014-15 and to a low of 7.3 % in 2015-16.

The ratio of computer hardware imports to exports of computer services, which was falling prior to the 2008 financial crisis, has since shown signs of rising.

CHAPTER 37

Development & Environment

MILLENNIUM DEVELOPMENT GOALS (MDGS)

In September 2000, leaders of 189 countries gathered at the United Nations headquarters and signed the historic Millennium Declaration, in which they committed to words achieving a set of eight measurable goals that range from halving extreme poverty and hunger to promoting gender equality and reducing child mortality, by the target date of 2015.

The Millennium Development Goals (MDGs)
• Eradicate extreme poverty and hunger
• Achieve universal primary education
• Promote gender equality and empower women
• Reduce child mortality
• Improve maternal health
• Combating HIV/AIDs, malaria, and other diseases
• Ensure environmental sustainability
• Develop a global partnership for development

The MDGs were revolutionary in providing a common language to reach global agreement. These 8 goals were realistic and easy to communicate, with a clear measurement/monitoring mechanism.

Substantial progress has been made regarding the MDGs. The world realized the first MDG of halving the extreme poverty rate by 2015. However, the achievements had been uneven. When the MDGs were set to expire in 2015 then discussions on post-2015 agenda continued, and the focus was on building a sustainable world where environmental sustainability, social inclusion, and economic development were equally valued.

The MDG Fund contributed directly and indirectly to the achievement of the MDGs. It adopted an inclusive and comprehensive approach to the MDGs. The approach was guided by the Millennium Declaration and its emphasis on development as a right, with targeted attention directed towards traditionally marginalized groups such as ethnic minorities, indigenous groups, and women.

THE GLOBAL CONSULTATION OF SUSTAINABLE DEVELOPMENT GOALS

The United Nations Conference on Sustainable Development - or Rio+20 - took place in Rio de Janeiro, Brazil on 20-22 June 2012. It resulted in a focused political outcome document which contains clear and practical measures for implementing sustainable development.

The Conference also adopted ground-breaking guidelines on green economy policies.

In July 2014, the UN General Assembly Open Working Group (OWG) proposed a document containing 17 goals to be put forward for the General Assembly's approval in September 2015.

This document set the ground for the new SDGs and the global development agenda spanning from 2015-2030.

EXERCISE

1. Human Development Report for 'each' of the year at global level has been published by: **[December-2006]**
(a) UNDP
(b) WTO
(c) IMF
(d) World Bank

2. The slogan "A tree for each child" was coined for **[June-2010]**
(a) Social forestry programme
(b) Clean Air programme
(c) Soil conservation programme
(d) Environmental protection programme

3. Match Lists I and II and select the correct answer from the codes given below : **[June-2012]**

List – I	List – II
(i) Ozone hole	A. Tsunami
(ii) Greenhouse effect	B. UV radiations
(iii) Natural hazards	C. Methane
(iv) Sustainable development	D. Eco-centrism

Codes :

	(i)	(ii)	(iii)	(iv)
(a)	B	C	A	D
(b)	C	B	A	D
(c)	D	C	A	B
(d)	D	B	C	A

4. Which of the following is not a measure of Human Development Index ? **[December-2012]**
(a) Literacy Rate (b) Gross Enrolment
(c) Sex Ratio (d) Life Expectancy

5. 'Minamata disaster' in Japan was caused by pollution due to **[December-2012]**
(a) Lead (b) Mercury
(c) Cadmium (d) Zinc

6. At present, in terms of per capita energy consumption (kWh/year), identify the correct sequence. **[December-2015]**
(a) Brazil > Russia > China > India
(b) Russia > China > India > Brazil
(c) Russia > China > Brazil > India
(d) China > Russia > Brazil > India

7. Sustainable development goals have specific targets to be achieved by **[July-2016]**
(a) 2022 (b) 2030
(c) 2040 (d) 2050

8. Indian government's target of producing power from biomass by the year 2022, is **[July-2016]**
(a) 50 MW (b) 25 MW
(c) 15 MW (d) 10 MW

9. **Assertion (A):** The problems of environmental sustainability are difficult to resolve.
Reason (R): Our understanding how environment works and how different human choices affect environment is inadequate. **[August-2016]**
Choose the correct code:
(a) Both (A) and (R) are correct and (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, but (R) is not the correct explanation of (A).
(c) (A) is true and (R) is false.
(d) (A) is false and (R) is true.

10. Indian government's target for power production from small hydro projects by the year 2022 is **[January-2017]**
(a) 1 Giga-Watt (b) 5 Giga-Watt
(c) 10 Giga-Watt (d) 15 Giga-Watt

11. **Assertion (A) :** Sustainable development is critical to well being of human society.
Reason (R) : Environmentally sound policies do not harm the environment or deplete the natural resources.
Choose the correct code : [January-2017]
(a) Both (A) and (R) are correct and (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, but (R) is not the correct explanation of (A).
(c) (A) is true and (R) is false.
(d) (A) is false and (R) is true.

12. The time frame for the implementation of Millennium Development Goals was: **[20th June 2019-Ist Shift]**
(a) 2000—2005
(b) 2000—2015
(c) 2005—2010
(d) 2000—2012

13. Consider the following statements in the context of Millennium Development Goals (MDGs) adopted by the United Nations. **[20th June 2019-IInd Shift)]**
(1) Eradicate extreme poverty and hunger.
(2) Improve maternal health.
(3) Responsible consumption and production.
(4) Reduce child mortality.
Choose the correct answer from the options given below.
(a) (1), (2) and (3) (b) (2), (3) and (4)
(c) (1), (2) and (4) (d) (1), (3) and (4)

14. Which one of the following conferences/summit is also known as UN Conference on Sustainable Development (UNCSD)? **[21st June 2019-Ist Shift]**
(a) The Stockholm Conference, 1972
(b) The Rio de Janerio Conference, 1992
(c) The Johannesburg Summit, 2002
(d) The Rio+ 20 Conference, 2012

15. **Statements I :** The Millennium Development Goals were adopted in the United Nations in the year 2010.
Statement II: Developing a global partnership for development was one of the Millennium Development Goals.
Which of the above statements is/are correct?
[21st June 2019-Ist Shift]
(a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

16. The target set by Indian government for power from roof-top solar installations by the year 2022 is
[21st June 2019-IInd Shift]
(a) 40.0 GW (b) 50.0 GW
(c) 60.0 GW (d) 100.0 GW

17. Which of the following are priority areas in relation to the Sustainable Development Goals?
[24th June 2019-Ist Shift]
(1) No poverty
(2) Zero hunger
(3) Reducing urbanization
(4) Peace, justice and strong institutions
Choose the correct answer from the options given below:
(a) (1), (2), (3) (b) (1), (3), (4)
(c) (2), (3), (4) (d) (1), (2), (4)

18. Which of the following statements best explains the concept of sustainable development?
[24th June 2019-IInd Shift]
(a) Use of natural resources minimally.
(b) Use of natural resources for our benefit.
(c) Use of natural resources judiciously so that they are available for further generations.
(d) Preserve our natural resources for our future generation.

19. Identify the Sustainable Development Goals from the list given below : **[2nd Dec. 2019-IInd Shift]**
(i) Zero Hunger
(ii) Quality Education
(iii) Universal Primary Education
(iv) Clean Water and Sanitation

(v) Green Agriculture
(vi) Climate Action
Select correct answer from the options given below:
(a) (i), (ii), (iii) and (iv)
(b) (ii), (iii), (iv) and (v)
(c) (iii), (iv), (v) and (i)
(d) (i), (ii), (iv) and (vi)

20. The themes of some Sustainable Development Goals are **[4th Dec. 2019-Ist Shift]**
(A) Climate action
(B) Sustainable cities and communities
(C) Peace, justice and strong institutions
(D) Skill development and decent employment
(E) Green agriculture
(F) Responsible consumption and production
Choose the most appropriate from those given below :
(a) (A), (B), (C), (E) and (F)
(b) (B), (C), (E) and (F)
(c) (B), (C), (D), (E) and (F)
(d) (A), (B), (C) and (F)

21. Which of the following was not a Millennium Development Goal (MDG)? **[4th Dec. 2019-IInd Shift]**
(a) Eradicate extreme poverty and hunger
(b) Improve maternal health
(c) Ensure healthy lives and promote well being for all at all ages
(d) Ensure environmental sustainability

22. Consider the following statements: **[5th Dec. 2019-IInd Shift]**
(A) The Millennium Development Goals were to be achieved by 2015
(B) The Sustainable Development Goals will guide United Nations Development Programme Policy until 2035
(C) The Sustainable Development Goals came into effect in January 2016
Which of the above statements are correct?
(a) (A) and (B) only (b) (B) and (C) only
(c) (A) and (C) only (d) (A), (B) and (C)

23. Which of the following groups of electronic scientists has been given in an order chronologically? **[5th Dec. 2019-Ist Shift]**
(a) Guglielmo (G.) Marconi, Lumiere Brothers, Lee forest, John Fleming and John Logie Baird
(b) John Logie Baird, Lumiere Brothers, Guglielmo (G.) Marconi, Lee forest and John Fleming
(c) Lee forest, John Fleming, Lumiere Brothers, Guglielmo (G.) Marooni and John Logie Baird
(d) Lumiere Brothers, Guglielmo (G.) Marconi Lee forest, John Fleming and John Logie Baird

HINTS & EXPLANATION

1. (a) The Human Development Report (HDR) is an annual milestone published by the Human Development Report Office of the United Nations Development Programme (UNDP). As of 2013 the last decade saw convergence in human development indicators (HDI) values globally, although progress was uneven within and between regions.

2. (d) The slogan "A tree for each child" was coined for Environmental protection programme.

3. (a) Ozone hole – UV radiations
Greenhouse effect – Methane
Natural hazards – Tsunami
Sustainable development – Eco-centrism

4. (c) The Human Development Index (HDI) is a statistic composite index of life expectancy, education, and per capita income indicators, which are used to rank countries into four tiers of human development.

5. (b) Minamata disease was first discovered in Minamata city in Kumamoto prefecture, Japan, in 1956. It was caused by the release of methylmercury in the industrial wastewater from the Chisso Corporation's chemical factory.

6. (c) Currently, in terms of per capita energy consumption (kWh/year), the correct sequence is–Russia, China, Brazil and India.

7. (b) The High-level Political Forum on Sustainable Development is the central UN platform for the follow-up and review of the 2030 Agenda for Sustainable Development adopted at the United Nations Sustainable Development Summit on 25 September 2015.

8. (d) The 2022 electrical power targets include achieving 227GW (earlier 175 GW) of energy from renewable sources - nearly 113 GW through solar power, 66 GW from wind power, 10 GW from biomass power, 5GW from small hydro and 31GW from floating solar and offshore wind power.

9. (a) Both (A) and (R) are correct and (R) is the correct explanation of (A).

10. (b) Indian government's target for power production from small hydro projects by the year 2022 is 5 Giga-Watt. On the other hand, from solar power, it is 100 GW, 60 GW from wind, 10 GW from biomass, according to the ministry of new and renewable energy.

11. (b) Both (A) and (R) are correct but (R) is not the correct explanation of (A).

12. (b) The United Nations Millennium Development Goals (MDGs) are the eight goals set by the 189 UN member states in September 2000 and agreed to be achieved by the year 2015. The Millennium Declaration was signed at the September global summit held at the UN headquarters in New York and the 149 international leaders in attendance committed to combating disease, hunger, poverty, illiteracy, discrimination against women and environmental degradation.

13. (c) The United Nations Millennium Development Goals (MDGs) are the eight goals set by the 189 UN member states in September 2000 and agreed to be achieved by the year 2015. The MDGs are derived from this Declaration, and all have specific targets and indicators. The Eight Millennium Development Goals are to eradicate extreme poverty and hunger, to achieve universal primary education, to promote gender equality and empower women, to reduce child mortality, to improve maternal health, to combat HIV/AIDS, malaria, and other diseases, to ensure environmental sustainability and to develop a global partnership for development.

14. (d) The United Nations Conference on Sustainable Development, also known as Rio 2012, Rio+20, or Earth Summit 2012 was the third international conference on sustainable development aimed at reconciling the economic and environmental goals of the global community. It took place in Rio de Janeiro, Brazil on 20-22 June 2012. It resulted in a focused political outcome document which contains clear and practical measures for implementing sustainable development.

15. (b) The Millennium Development Goals (MDGs) were eight international development goals for the year 2015 that had been established following the Millennium Summit of the United Nations in 2000, following the adoption of the United Nations Millennium Declaration. MDGs – which range from halving extreme poverty rates to halting the spread of HIV/AIDS and providing universal primary education, all by the target date of 2015 – form a blueprint agreed to by all the world's countries and the entire world's leading development institutions.

16. (d) The country has set an ambitious target of installing 175 GW of renewable energy capacity by the year 2022, which includes 100 GW from solar, 60 GW from wind, 10 GW from bio-power and 5 GW from small hydro-power.

17. (d) The Sustainable Development Goals are the blueprint to achieve a better and more sustainable future for all. The priority areas in relation to UN SDG goals are Peace, Justice and Strong Institutions, No Poverty, Zero Hunger, Good Health and Well-being, gender equality, Quality education etc.

18. (c) According to Brundtland Report the sustainable development is explained as "the development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

19. (d) The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by all United Nations Member States in 2015 as a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030. The General Assembly adopted the 2030 Agenda for Sustainable Development that includes 17 Sustainable Development Goals (SDGs). Some important SDGs are No Poverty, Zero Hunger, Good Health and Well-Being, Quality Education, Gender Equality, Clean Water and Sanitation and Climate Action. Within these goals there are 169 targets, to put a bit of meat on the bones.

20. (d) The themes of some Sustainable Development Goals are Climate action, Sustainable cities and communities, Peace, justice and strong institutions, Responsible consumption and production, No Poverty, Zero Hunger, Good Health, Quality education, Gender equality, Clean water & Sanitation, Affordable & Clean energy, Sustainable cities and Communities, Life below water, Life of land.

21. (c) The Millennium Development Goals (MDGs) are eight goals with measurable targets and clear deadlines for improving the lives of the world's poorest people. The eight MDGs are to eradicate extreme poverty and hunger, to achieve universal primary education, to promote gender equality and empower women, to reduce child mortality, to improve maternal health, to combat HIV/AIDS, malaria, and other diseases, to ensure environmental sustainability and to develop a global partnership for development. Thus Ensure healthy lives and promote well beings for all at all ages is not mention in eight MDGs.

22. (c) The United Nations Millennium Development Goals are eight goals that all 191 UN member states have agreed to try to achieve by the year 2015. The Sustainable Development Goals (SDG) will guide United Nations Development Programme Policy until 2030. In September 2015 at the UN General Assembly Summit, 193 member states adopted 2030 Agenda for Sustainable Development in which the 17 SDGs and 169 targets are included. It came into effect on 1 January 2016.

23. (d) The Lumière brothers were born in Besançon, France in 1840. *Lee* de *Forest* was an American inventor born in 1873. *John Logie Baird* was a very famous Scottish engineer and inventor of one of the first televisions. He demonstrated his working television on 26 January 1926.

CHAPTER 38

Human and Environment Interaction

HUMAN AND ENVIRONMENTAL INTERACTIONS: ANTHROPOGENIC ACTIVITIES AND THEIR IMPACT ON ENVIRONMENT

Human Environmental Interactions can be defined as interactions between the human social system and the ecosystem. Human social systems and ecosystems are complex adaptive systems (Marten, 2001). It is complex because ecosystems and human social systems have many parts and many connections between these parts. It is adaptive because they have feedback structures that promote survival in a constantly changing environment.

Human-environment interaction provides a framework that brings together scholarship sharing both disciplinary depth and interdisciplinary scope to examine past, present, and future social and environmental change in different parts of the world.

Human environment interaction is the way people adapt and modify the environment. There are three types of human environment interaction:

i. The way people depend on the environment for food, water, timber, natural gas etc
ii. The way people adopt the environment to fulfil their own needs
iii. The way people modify the environment positively or negatively like drilling holes, building dams

SOME EXAMPLES OF HUMAN ENVIRONMENT INTERACTIONS

The use of natural resources

People use different kinds of natural reserves like timber, metals, and oil in the day to day lives. There is also a dependence on food and water for a continued existence. People also require energy for various reasons such as cooking at home and industrial purposes. From clothes, transport services, constructions, electronic devices and other items that are used all need different resources so as to be produced.

Deforestation

Deforestation happens when forests get cut down and the trees are not replaced or permitted to grow back. Countries such as Ethiopia, Mexico, Brazil, America, Congo, and India have cleared a lot of its forests for economic and agricultural purposes to meet the food demand, fuel and building materials. These activities have led to a steady loss of areas with forests and it still continues. Converting forests to agricultural areas decreases biodiversity which is essential for human beings. They use other living organisms for getting their requirements such as food, medication and ecological processes.

Organisms such as plant life and micro-organisms have a crucial role of maintaining people's lives and the ecosystem by giving air, purifying the air, decontaminating the water, decomposing wastes and preventing soil erosion.

Energy resources

Using of renewable or non-renewable sources demonstrate human environmental interaction as the energy is used to power transport and communication systems, electrical equipment, and our homes as well as offices. Fossil fuels have been the key ingredient in the world's globalization, but since they cannot be renewed, the amount is eventually inadequate and their usage is not sustainable in the long-run. There are a number of renewable energies that can be used instead of fossil fuels like wind power, hydroelectric power, and solar power that work by converting the wind's, water, and sun's energy into electricity respectively.

Water resources

The use of water resources highly signifies human environmental interaction. Water has a lot of uses, from domestic to agricultural and in industrial processes. The relative quantities of the three groups differ in various parts of the universe. However, agriculture generally uses the largest quantity of water. The rising demand in water is leading to unsustainable use of water sources.

Human Impacts on the Environment

Humans impact the physical environment in many ways: overpopulation, pollution, burning fossil fuels, and deforestation. Changes like these have triggered climate change, soil erosion, poor air quality, and undrinkable water. These negative impacts can affect human behavior and can prompt mass migrations or battles over clean water.

The anthropogenic activities on the environment cause topographic changes that have strong repercussions, some positive (afforestation, embankments) but other negative (deforestation, soil erosion, and inning).

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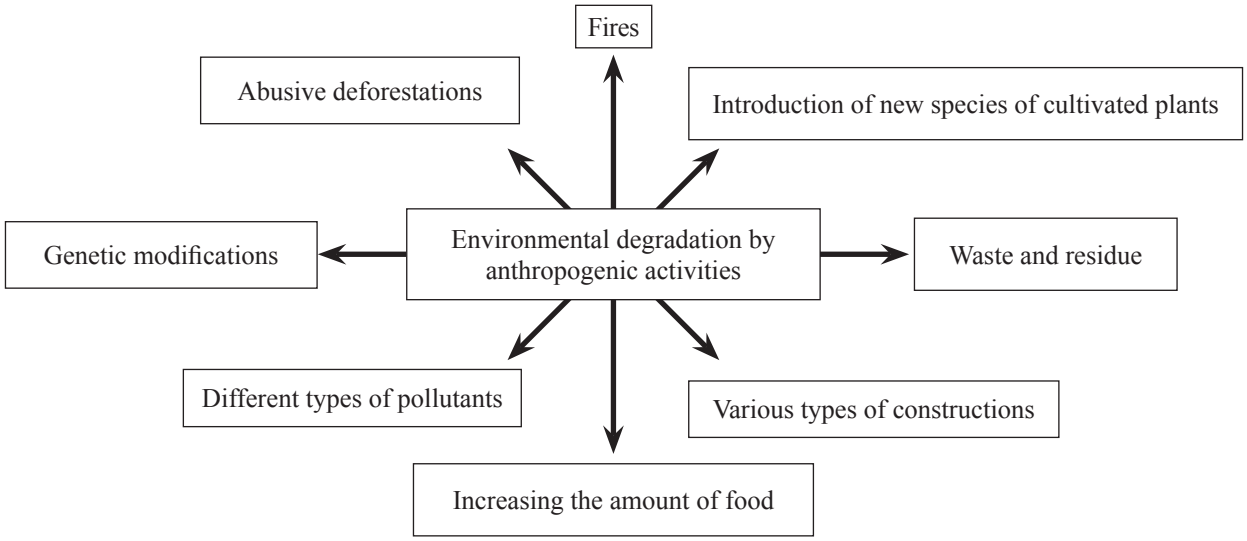
Sources of environmental degradation by anthropogenic actions



EXERCISE

1. In the study of man - environment interaction, the statement of Miss Semple that "the humans are solely the product of their environment", is : **[December-2004]**
(a) An opinion
(b) A prejudice
(c) A fact
(d) A widely accepted phenomenon

2. In analysis of man - environment relationship Pragmatic Possibilism implies that : **[December-2004]**
(a) There is no limit for man to exploit resources of earth
(b) There are limited possibilities to explore earth's resources
(c) The man has to watch and assess the situation and then go ahead with resource utilization
(d) The man has to keep in mind only his basic needs while planning to harness the potential of resourceful earth

3. Arrange Column II in proper sequence so as to match it with Column I and choose the correct answer from the code given below : **[December-2004]**

Column I (Activity)	**Column II (Noise level)**
A. Hearing	(i) 30 dB
B. Whispering	(ii) 1 dB
C. Interference with sleep	(iii) 60 dB
D. Normal talk	(iv) 30 - 50 dB

Codes :

	A	**B**	**C**	**D**
(a)	(i)	(ii)	(iii)	(iv)
(b)	(ii)	(i)	(iv)	(iii)
(c)	(iv)	(ii)	(iii)	(i)
(d)	(iii)	(i)	(ii)	(iv)

4. Which one of the following is used to stop bleeding? **[June-2005]**
(a) Vitamin A (b) Vitamin U
(c) Vitamin B (d) Vitamin K

5. The chemical formula of Baking soda is **[June-2005]**
(a) $Na_2 CO_3 10H_2O$ (b) $NaHCO_3$
(c) $Na_2 CO_3 H_2O$ (d) $NH_4 Cl$

6. Match the following **[June-2005]**

List -I	**List -II**
A. Tehri Dam	1. Ganga
B. Sardar Sarovar	2. Beas and Sutlej
C. Indira Gandhi Canal	3. Narmada
D. Nagarjunsagar	4. Krishna
	5. Bhagirathi

(a) A-5 B-3 C-2 D-4 (b) A-5 B-3 C-2 D-1
(c) A-5 B-3 C-4 D-2 (d) A-5 B-3 C-1 D-2

7. Main pollutant of the Indian coastal water is : **[December-2005]**
(a) oil spill (b) municipal sewage
(c) industrial effluents (d) aerosols

8. The cloudy nights are warmer compared to clear nights (without clouds) during winter days. This is because: **[December-2005]**
(a) clouds radiate heat towards the earth
(b) clouds prevent cold wave from the sky, descend on earth
(c) clouds prevent escaping of the heat radiation from the earth
(d) clouds being at great heights from earth absorb heat from the sun and send towards the earth

9. Match List - I (Dams) with List - II (River) in the following **[December-2005]**

List - I (Dams)	**List - II (River)**
A. Bhakra	(i) Krishna
B. Nagarjunasagar	(ii) Damodar
C. Panchet	(iii) Sutlej
D. Hirakud	(iv) Bhagirathi
E. Tehri	(v) Mahanadi

Codes :

	A	B	C	D	E
(a)	v	iii	iv	ii	i
(b)	iii	i	ii	v	iv
(c)	i	ii	iv	iii	v
(d)	ii	iii	iv	i	v

10. Human ear is most sensitive to noise in the following frequency ranges **[December-2005]**
(a) 1 – 2 KHz (b) 100 – 500 Hz
(c) 10 – 12 KHz (d) 13 – 16 KHz

11. Malaria is caused by : **[December-2005]**
(a) bacterial infection (b) viral infection
(c) parasitic infection (d) fungal infection

12. Tamilnadu coastal belt has drinking water shortage due to: **[June-2006]**
(a) high evaporation
(b) sea water flooding due to tsunami
(c) over exploitation of ground water by tube wells
(d) seepage of sea water

13. The maximum emission of pollutants from fuel sources in India is caused by: **[December-2006]**
(a) Coal (b) Firewood
(c) Refuse burning (d) Vegetable waste product

14. Comparative Environment Impact Assessment study is to be conducted for: **[June-2007]**
(a) the whole year
(b) three seasons excluding monsoon
(c) any three seasons
(d) the worst season

15. The great Indian Bustard bird is found in: **[December-2007]**
(a) Thar Desert of India
(b) Coastal regions of India
(c) Temperate Forests in the Himalaya
(d) Tarai zones of the Himalayan Foot

16. Deforestation during the recent decades has led to: **[December-2007]**
(a) Soil erosion (b) Landslides
(c) Loss of bio-diversity (d) All of these

17. Slums in metro-city are the result of: **[December-2007]**
(a) Rural to urban migration
(b) Poverty of the city-scape
(c) Lack of urban infrastructure
(d) Urban-governance

18. Match List-I with List-II and select the correct answer from the codes given below: **[December-2008]**

List-I (National Parks)	**List - II (States)**
A. Periyar	(i) Orissa
B. Nandan Kanan	(ii) Kerala
C. Corbett National Park	(iii) Rajasthan
D. Sariska Tiger Reserve	(iv) Uttarakhand

Codes :

	A	B	C	D
(a)	(ii)	(i)	(iv)	(iii)
(b)	(i)	(ii)	(iv)	(iii)
(c)	(iii)	(ii)	(i)	(iv)
(d)	(i)	(ii)	(iii)	(iv)

19. Which of the following pairs regarding typical composition of hospital wastes is incorrect? **[December-2008]**
(a) Plastic- 9-12% (b) Metals- 1-2%
(c) Ceramic- 8-10% (d) Biodegradable- 35-40%

20. The Sagarmanthan National Park has been established to preserve the eco-system of which mountain peak ? **[December-2009]**
(a) Kanchenjunga (b) Dhaulavira
(c) Annapurna (d) Mount Everest

21. **Assertion (A) :** In the world as a whole, the environment has degraded during past several decades.
Reason (R) : The population of the world has been growing significantly. **[June-2010]**
(a) (A) is correct, (R) is correct and (R) is the correct explanation of (A).
(b) (A) is correct, (R) is correct and (R) is not the correct explanation of (A).
(c) (A) is correct, but (R) is false.
(d) (A) is false, but (R) is correct.

22. Which one of the following continents is at a greater risk of desertification ? **[December-2013]**
(a) Africa (b) Asia
(c) South America (d) North America

23. The most comprehensive approach to address the problems of manenvironment interaction is one of the following : **[December-2013]**
(a) Natural Resource Conservation Approach
(b) Urban-industrial Growth Oriented Approach
(c) Rural-agricultural Growth Oriented Approach
(d) Watershed Development Approach

24. Which one of the following biosphere reserves has UNESCO recognition ? **[September-2013]**
(a) Manas (b) Kanchenjunga
(c) Seshachalam Hills (d) Greater Nicobar

25. Match List – I with List – II and find the correct answer from the codes given below : **[September-2013]**

List – I (Biosphere Reserve)	**List – II (Area of Location)**
A. Nilgiri	i. Deccan Peninsula
B. Manas	ii. Chhattisgarh
C. Similipal	iii. Eastern Himalaya
D. Achankmar-Amarkantak	iv. Western Ghat

Codes :

	A	B	C	D
(a)	i	ii	iii	iv
(b)	ii	iii	iv	i
(c)	iii	iv	ii	i
(d)	iv	iii	i	ii

26. Which of the anthropogenic activity accounts for more than 2/3rd of global water consumption? **[December-2014]**
(a) Agriculture
(b) Hydropower generation
(c) Industry
(d) Domestic and Municipal usage

27. The factors which are most important in determining the impact of anthropogenic activities on environment are : **[June-2015]**
(a) Population, affluence per person, land available per person
(b) Population, affluence per person and the technology used for exploiting resources
(c) Atmospheric conditions, population and forest cover
(d) Population, forest cover and land available per person

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28. **Assertion (A):** People population control measures do not necessarily help in checking environmental degradation.
Reason (R) : The relationship between population growth and environmental degradation is rather complex.
Choose the correct answer from the following :
[December-2015]
(a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).
(c) (A) is true but (R) is false.
(d) (A) is false but (R) is true.

29. **Assertion (a) :** In urban areas, smog episodes occur frequently in winters.
Reason (R) : In winters, a lot of biomass is burnt by people for heating purposes or to keep themselves warm.
Choose the correct answer from the code given below :
[November-2017]
(a) Both (a) and (R) are true and (R) is the correct explanation of (a)
(b) Both (a) and (R) are true but (R) is not the correct explanation of (a)
(c) (a) is true and (R) is false
(d) Both (a) and (R) are false

30. **Assertion (A) :** Environmental and social impact assessments never overlap with each other. **[December-2018]**
Reason (R) : Environmental and social impact assessments are effectively opposite ends of the same spectrum.
(a) (A) is false, but (R) is true.
(b) (A) is true, but (R) is false.
(c) Both (A) and (R) are true and (R) is the correct explanation of (A).
(d) Both (A) and (R) are true and (R) is not the correct explanation of (A).

31. Recent study showed that, River Ganga will not flow cleaner in the near future. Which of the following reasons is false? **[December-2018]**
(a) Increased sewage
(b) Climatic change
(c) Thinning of flow rate of the river
(d) Failure of treatment plants

32. The duration for which of the usable compost generation is 3–6 months? **[20th June 2019-Ist Shift]**
(a) Vermi composting
(b) Semi-Automatic waste converter
(c) Pit composting
(d) Automatic waste converter

33. Chemical oxygen demand in eutrophic water is:
[24th June 20-IInd Shift]
(a) Low (b) High
(c) Medium (d) Extremely low

34. The long term effect of cutting down of trees in large areas of rain forests is **[25th June 2019-IInd Shift]**
(a) Increased rain fall in those areas
(b) Decreased rain fall in those areas
(c) Increase in wind speeds in those areas
(d) Increased rate of soil erosion in those areas

35. **Assertion (A):** Night time temperatures in the central parts of a city are generally higher than those over the surrounding rural areas. **[20th June 2019-IInd Shift]**
Reason (R): Radiation losses over the urban areas are less than that over the rural areas.
Choose the correct answer from the options given below:
(a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).
(c) (A) is true but (R) is false.
(d) (A) is false but (R) is true.

36. **Statement I:** Most of the member countries in the International solar Alliance are located between the Tropic of Cancer and Tropic of Capricorn. **[20th June 2019-IInd Shift]**
Statement II: Japan is a member country of the International solar alliance.
Which of the above statement is/are correct?
(a) I only (b) II only
(c) Both I and II (d) Neither I nor II

37. Given below are two statements — one labelled as Assertion (A) and the other labelled as Reason (R)
[5th Dec. 2019-Ind Shift]
Assertion (A): In the afternoon of a hot sunny day during the summer season, the tropospheric ozone levels in a city like Delhi are expected to be lower as compared to morning and Evening.
Reason (R): In the afternoon period, atmosphere is unstable and its dilution potential is higher as compared to mornings and evenings. In the light of the above two statements, choose the correct option:
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

38. How many National Parks and Wildlife Sancturies were there in India till March 2011? **[4th Dec. 2019-IInd Shift]**
(a) 8 and 421 only (b) 10 and 75 only
(c) 75 and 421 only (d) 102 and 515 only

39. Biosphere reserves are : **[3rd Dec. 2019-Ist Shift]**
(i) area comprising terrestrial, marine and coastal ecosystems.
(ii) monitored by national governments.
(iii) areas where threatened animals and plants are kept in their habitat.
(iv) wildlife sanctuaries.
Choose the correct statements from the options given below:
(a) (i) and (ii) (b) (ii) and (iii)
(c) (iii) and (iv) (d) (i) and (iv)

40. Given below are two statements - one is labelled as Assertion (A) and the other is labelled as Reason (R):
[5th Dec. 2019-IInd Shift]
Assertion (A): Forests help in improving the air quality of a place.
Reasons (R): Some tree species emit volatile organic compounds (VOCS) such as isoprene which may contribute to formation of tropospheric ozone.
In the light of the above statements choose the correct option:
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(c) (A) is true, but (R) is false
(d) (A) is false, but (R) is true

HINTS & EXPLANATION

1. (c) A **fact** is verifiable by researching the evidence. The statement of Ellen Churchill Semple is a fact as research has proved it true.
An **opinion** is a judgment based on a reasonable conclusion drawn from factual evidence.
A **prejudice** is a half-baked opinion based on insufficient or unexamined evidence; and it can be contested and disproved on the basis of facts.
A **belief** is an untestable conviction based on cultural or personal faith, morality, or values.

2. (c) **Possibilism,** in analysis o man-environment relationship holds that although the environment places certain constraints and limitations in human life, culture is possible to be developed independent of nature by human social conditions.
It is opposed to **Determinism** which holds that every aspect of human life is dependent on natural environment which determines all human activity and culture.
Pragmatism holds human experience of the world as the only reality; and advocates putting thought into decisive action. **Pragmatic possibilism** therefore, implies that man must act pragmatically, i.e., he must take cognizance of the environmental situation (climate change, depletion of reserves, etc.) and decisively alter the way he utilizes the natural resources in order to conserve them for posterity.

3. (b)
- Hearing – 1 dB
- Whispering – 30 dB
- Interference with sleep – 30-50 dB
- Normal talk – 60 dB

4. (d) Vitamin K is used to treat and prevent low levels of certain substances (blood clotting factors) that your body naturally produces. These substances help your blood to thicken and stop bleeding normally (e.g., after an accidental cut or injury).

5. (b) $NaHCO_3$. Sodium bicarbonate, also commonly known as baking soda, is commonly seen as a white, fine powder and has the chemical formula $NaHCO_3$. It has one sodium atom, one hydrogen atom, one carbon atom, and three oxygen atoms. It is a very useful chemical that is alkaline in nature.

6. (a) 5 3 2 4.

Tehri Dam	–	Bhagirathi
Sardar Sarovar	–	Narmada
Indira Gandhi Canal	–	Beas and Sutlej
Nagarajunsagar	–	Krishna

7. (c) The coastal water receives 0·41 km3 of industrial wastes. Nearly 447 million tonnes of oil and its products are transported through the Arabian Sea and Bay of Bengal with the result that some of our coastal areas particularly adjoining the large cities are getting polluted.

8. (c) If skies are clear, heat emitted from the earth's surface freely escapes into space resulting in colder temperatures. However, if clouds are present, some of the heat emitted from the earth's surface is trapped by the clouds and reemitted back towards the earth.

9. (b) Bhakra Dam - Satluj River
Nagarjuna Sagar Dam - Krishna River
Panchet Dam - Damodar River at Panchet in Jharkhand
Hirakud Dam - Mahanadi River in Odisha
Tehri Dam - Bhagirathi River in Uttarakhand

10. (*) The commonly stated range of human hearing is 20 Hz to 20 kHz. ... Humans are most sensitive to (i.e. able to discern at lowest intensity) frequencies between 2,000 and 5,000 Hz. Hence, all options are wrong.

11. (c) Malaria is a mosquito-borne parasitic infection spread by Anopheles mosquitoes. The Plasmodium parasite that causes malaria is neither a virus nor a bacterium – it is a single-celled parasite that multiplies in red blood cells of humans as well as in the mosquito intestine.

12. (d) There has been an acute water shortage in Tamilnadu coastal belt which is due to seepage of sea water.

13. (a) The maximum emission of pollutants from fuel sources in India is caused by coal.

14. (a) Comparative Environment Impact Assessment study is to be conducted for the whole year.

15. (a) Desert National Park is located in the Jaisalmer district of the state of Rajasthan. The great Indian Bustard is a magnificent bird and can be seen in considerably good numbers in this park.

16. (d) Deforestation during the recent decades has led to soil erosion, landslides and loss of bio-diversity.

17. (a) The rapid urbanization in conjunction with industrialization and lack of infrastructural and employment opportunities in rural areas has led to mass rural-urban migration and this has resulted in the growth of slums in metro cities.

18. (a) Periyar – Kerala
Nandankanan – Orissa
Corbett National Park – Uttarakhand
Sariska Tiger Reserve – Rajasthan

19. (a) This study evaluated the physical and elemental composition of the hospital waste at the National Taiwan University Hospital (NTUH). The NTUH waste consisted of 99.02% combustible wastes and 0.97% noncombustible wastes by mass. The combustible wastes constituted paper (16.17%), textiles (9.77%), cardboard, wood, and leaves (1.12%), food waste (21.51%), and plastics (50.45%).

20. (d) Sagarmatha National Park is a national park in the Himalayas of eastern Nepal that is dominated by Mount Everest.

21. (a) (A) is correct, (R) is correct and (R) is the correct explanation of (A).

22. (a) Desertification is a serious problem in Africa. It has been estimated that 319 million hectares of Africa are vulnerable to desertification hazards due to sand movement.

23. (d) The most comprehensive approach to address the problems of man-environment interaction is the Watershed Development Approach.

24. (d) Greater Nicobar biosphere reserve has UNESCO recognition. Other UNESCO recognised biosphere reserves in india are – Agasthyamala Biosphere Reserve (ABR), Nilgiri (Western Ghats), Gulf of Mannar (Tamil Nadu), Sunderban (West Bengal), Nanda Devi (Uttarakhand), Nokrek (Meghalaya), Pachmarh (Madhya Pradesh), etc.

25. (d) The Nilgiri Biosphere Reserve is an International Biosphere Reserve in the Western Ghats. Manas national park is situated in the foothills of Bhutanese Himalayas in Assam. Simlipal National Park is a national park and a tiger reserve in the Mayurbhanj district in the Indian state of Odisha. The Achanakmar-Amarkantak Biosphere Reserve is a biosphere reserve that extends across the states of Madhya Pradesh and Chhattisgarh, covering a total area of 383,551 hectares.

26. (a) Approximately two-third of the world's water activity accounts for agriculture.

27. (b) The most important factors which determine the impact of anthropogenic activities on environment are:
Population, affluence per person and the technology used for exploiting resources.

28. (a) Both A & R are individually true and R is the correct explanation of A.

29. (b) Both (A) and (R) are true but (R) is not the correct explanation of (A).

30. (a) (A) is false, but (R) is true.
Environmental and Social impacts assessment is a process of predicting and assessing the potential environmental and social impacts of a proposed project, evaluating alternatives and designing appropriate mitigation, management and monitoring measures. EIA and SIA are effectively opposite ends of the ame spectrum, so they do overlap

31. (b) Climate change has nothing to do with the river Ganga flowing cleaner.

32. (c) Pit composting also sometimes called trench composting is underground method of composting. It is a compact and tidy way to help your organic waste decompose and enrich your soil. The time duration to make compost through this method is 3-6 months.

33. (b) Chemical Oxygen Demand is the total measurement of all chemicals (organics & in-organics) in the water / waste water. Chemical Oxygen Demand (COD) in eurotrophic water is high.

34. (d) The rain forests are mainly found near the equatorial region. They are very dense forests and also known as 'Lungs of the World.' By cutting this area rapidly, we can face several long term effects which includes habitat destruction of biodiversity, losing out valuable potential herbs, forest produce and food etc, increase rate of soil erosion in those areas, increase the emission of Greenhouse gases, effect the climate change and enhance the possibility of natural calamities.

35. (a) In cities, the air, surface and soil temperatures are almost always warmer than in rural areas. This effect is known as the Urban Heat Island (UHI). UHI is usually strongest at night, as street surfaces and the adjacent air cool slowly. Above the roof level, the contributions of streets and building roofs together warm the overlying urban atmosphere.

36. (c) The International Solar Alliance is an alliance of more than 122 countries initiated by India, most of them being sunshine countries, which lie either completely or partly between the Tropic of Cancer and the Tropic of Capricorn.

37. (d) In the stratosphere, ozone molecules absorb ultraviolet radiation from the Sun and shield Earth from dangerous rays. But in the troposphere, near ground-level, ozone molecules are both air pollutants, threatening the health of living things, and greenhouse gases, trapping heat and contributing to climate change.
The highest ozone concentrations of the year generally occur during summer, when sunlight is most intense. Ozone concentrations consequently reach maximum shortly after the peak in vehicle traffic, about noon or soon thereafter. So, (A) is false. However, (R) is true; the atmosphere is most unstable during the afternoon because heating of the earth's surface heats up the air just above it which expands and its components get diluted.

38. (d) National parks are large areas of public land set aside for native plants, animals and the places in which they live. *Wildlife Sanctuary* is an area where the wildlife is protected in their natural habitat. No human is allowed there without an escort. According to National Wildlife Database, as of 2011 there were 102 national Parks and 518 Wild Life Sanctuaries in India but as of May 2019, .5 there became 104 national parks and 551 Wild Life Sanctuaries in India.

39. (a) Biosphere reserves are areas comprising terrestrial, marine and coastal ecosystems. Each reserve promotes solutions reconciling the conservation of biodiversity with its sustainable use. These are nominated by national governments and remain under the sovereign jurisdiction of the states where they are located.

40. (b) Forests improve air quality by absorbing carbon dioxide which traps much more heat from the sun than is required, leading to global warming. So, Assertion (A) is true.
Breathing **ozone** can trigger a variety of **health** problems including chest pain, coughing, throat irritation, and airway inflammation. It also can reduce lung function and harm lung tissue. **Tropospheric ozone** is a highly reactive oxidant that significantly reduces crop productivity as well as the uptake of atmospheric carbon by vegetation. It impedes plant growth and seed production, reduces functional leaf area and accelerates ageing. So, Reason (R) is true but does not explain (A).

CHAPTER 39

Environmental Issues

INTRODUCTION

Environmental issues are harmful effects of human activity on the biophysical environment. Environmentalism, a social and environmental movement, addresses environmental issues through advocacy, education and activism.

Our environment is constantly changing, which no one can deny. With these great environment changes, it becomes highly important for us to become increasingly aware of the environmental problems as well. With a monumental inundation of natural disasters warming and cooling periods, different types of environmental problems our earth is facing.

REGIONAL ENVIRONMENTAL DAMAGE

Those environmental damages which affect the living and non-living things locally over a small area are termed as *regional environmental damages*.

GLOBAL ENVIRONMENTAL DAMAGE

The environmental damages which affect the living and non living things globally or wider part of the earth are called global environmental damages.

Global Warming

Atmoshpheric gases like Carbondioxide (CO_2), Nitrogen oxide (NO_2), Methane (CH_4), Chlorofluro carbons (CFCs) and water vapour have the ability of trapping the outgoing radiation (infrared) from the surface of earth. Such trapped infrared radiation by the earth's surface cannot pass through these gases present in the atmosphere and exhibits the thermal energy or heat in the atmosphere. As a result the temperature of atmosphere is on rise globally. The phenomenon of increase in temperature *i.e.* heating in green houses are known as green house effect.

Green House Effect

The earth gets energy from the sun in the form of sunlight. The earth's surface absorbs some of this energy and heats up. That's why the surface of a road can feel hot even after the sun has gone down because it has absorbed a lot of energy from the sun. The earth cools down by giving off a different form of energy, called infrared radiation. But before all this radiation can escape to outer space, greenhouse gases in the atmosphere absorb some of it, which makes the atmosphere warmer. As the atmosphere gets warmer, it makes the earth's surface warmer, too. Without this Greenhouse effect the earth would be at least 30 degrees cooler, in which life would not exist.

Greenhouse Gases

A greenhouse gas (GHG) is a gas in an atmosphere that absorbs and emits radiation within the thermal infrared range. This process is the fundamental cause of the greenhouse effect. The primary greenhouse gases in Earth's atmosphere are water vapour, carbon dioxide, methane, nitrous oxide, ozone, and chlorofluorocarbons.

- **Water vapour** contributes to 36-72% of Greenhouse effect.
- **Carbon Dioxide** (CO_2) arises from burning fossil fuels and as a result of deforestation. It contributes to 9-26% of Greenhouse effect. It is the primary greenhouse gas emitted through human activities.
- **Methane** (CH_4), also called "*Marsh gas*", arises from rice paddies, wetlands, enteric fermentation in cattle, burning of wood, and landfills. It is responsible for about 4-9% of Greenhouse effect.
- **Nitrous Oxide** (NO_2) contributes (5%) which arises from coal burning, biomass burning, and breakdown of chemical fertilizers.
- **Chlorofluorocarbons** (*CFCs*) and their replacements (15%) are 1000 times more heat absorbent than carbon dioxide.
- **Ozone contributes** to 3-7% of Greenhouse effect. The largest net source of tropospheric ozone is influx from the stratosphere. Large amounts of ozone are also produced in the troposphere by photochemical reactions, the amounts increasing with high levels of air pollution.

Ozone Depletion

Ozone (O_3) is a gas found throughout the atmosphere, but most highly concentrated in the stratosphere, between *10 and 50 km* above the sea level, where it is known as the "*Ozone layer*". This Ozone layer forms a *protective shield* for the earth from the harmful *ultra-violet radiation* from outer space, particularly *UV-B* rays which affects *DNA molecules*, causing damage to the outer surface of plants and animals and also marine life. In humans it causes skin cancer, eye cataracts and is a general immuno-suppressant.

"Ozone Holes" were first discovered over *Antarctica* by the British Antarctica Survey in *1983*. Levels of ozone are dropping very fast, resulting in parts of the layer becoming thin and 'holes' developing because only a small percentage of O, gets naturally replenished every year.

Pollution refers to deterioration or unclean objectionable conditions in the quality of natural resources such as air, water and soil because of the action or presence of unwanted substances beyond a certain limit. Pollutants are the substances or effect introduced into the environment in significant amounts in solid, semi solid, liquid, gas or sub molecular particle form which has a detrimental effect on the environment.

Pollutants can be **natural** or man-made **(anthropogenic)**.

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EXERCISE

1. Global warning during winter becomes more pronounced at the : **[December-2004]**
(a) Equator (b) Poles
(c) Tropic of Cancer (d) Tropic of Capricorn

2. Which species of chromium is toxic in water : **[December-2005]**
(a) Cr^{+2} (b) Cr^{+3}
(c) Cr^{+6} (d) Cr is non-toxic element

3. Largest soil group of India is: **[December-2005]**
(a) Red soil (b) Black soil
(c) Sandy soil (d) Mountain soil

4. **Assertion (A) :** Aerosols have potential for modifying climate
Reason (R) : Aerosols interact with both short waves and radiation **[June-2006]**
(a) Both (A) and (R) are true, and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A)
(c) (A) is true, but (R) is false
(d) (A) is false, but (R) is true

5. The urbanisation process accounts for the wind in the urban centres during nights to remain: **[December-2006]**
(a) faster than that in rural areas
(b) slower than that in rural areas
(c) the same as that in rural areas
(d) cooler than that in rural areas

6. Arrange column II in proper sequence so as to match it with column I and choose the correct answer from the code given below: **[December-2006]**

Column I	**Column II**
Water Quality	**pH Value**
A. Neutral	(i) 5
B. Moderately acidic	(ii) 7
C. Alkaline	(iii) 4
D. Injurious	(iv) 8

Code:

	A	**B**	**C**	**D**
(a)	(ii)	(iii)	(i)	(iv)
(b)	(i)	(iii)	(ii)	(iv)
(c)	(ii)	(i)	(iv)	(iii)
(d)	(iv)	(ii)	(iii)	(i)

7. Sea level rise results primarily due to: **[June-2007]**
(a) Heavy rainfall
(b) Melting of glaciers
(c) Submarine volcanism
(d) Seafloor spreading

8. Chemical weathering of rocks is largely dependent upon: **[June-2008]**
(a) high temperature (b) strong wind action
(c) heavy rainfall (d) glaciation

9. Which one of the following units is used to measure intensity of noise? **[June-2008]**
(a) decibel (b) Hz
(c) Phon (d) Watts/m2

10. Human ear is most sensitive to noise in which of the following ranges: **[June-2008]**
(a) 1 – 2 KHz (b) 100 – 500 Hz
(c) 10 – 12 KHz (d) 13 – 16 KHz

11. Environmental impact assessment is an objective analysis of the probable changes in: **[June-2009]**
(a) physical characteristics of the environment
(b) biophysical characteristics of the environment
(c) socio-economic characteristics of the environment
(d) all the above

12. Which one of the following non-conventional energy sources can be exploited most economically ? **[December-2009]**
(a) Solar
(b) Wind
(c) Geo-thermal
(d) Ocean Thermal Energy Conversion (OTEC)

13. 'Chipko' movement was first started by **[December-2010]**
(a) Arundhati Roy (b) Medha Patkar
(c) Ila Bhatt (d) Sunderlal Bahuguna

14. The concentration of Total Dissolved Solids (TDS) in drinking water should not exceed **[December-2010]**
(a) 500 mg/L (b) 400 mg/L
(c) 300 mg/L (d) 200 mg/L

15. In mega cities of India, the dominant source of air pollution is **[June-2011]**
(a) transport sector (b) thermal power
(c) municipal waste (d) commercial sector

16. Which of the following is not a source of pollution in soil ? **[December-2011]**
(a) Transport sector (b) Agriculture sector
(c) Thermal power plants (d) Hydropower plants

17. Which of the following pollutants is not emitted from the transport sector ? **[December-2011]**
(a) Oxides of nitrogen
(b) Chlorofluorocarbons
(c) Carbon monoxide
(d) Poly aromatic hydrocarbons

18. Which is the source of chlorofluorocarbons ? **[June-2012]**
(a) Thermal power plants
(b) Automobiles
(c) Refrigeration and Airconditioning
(d) Fertilizers

19. Which of the following parameters is not used as a pollution indicator in water ? **[June-2012]**
(a) Total dissolved solids (b) Coliform count
(c) Dissolved oxygen (d) Density

20. Biomagnification means increase in the **[December-2012]**
(a) concentration of pollutants in living organisms
(b) number of species
(c) size of living organisms
(d) biomass

21. Which of the following is a source of methane? **[December-2012]**
(a) Wetlands (b) Foam Industry
(c) Thermal Power Plants (d) Cement Industry

22. The smog in cities in India mainly consists of **[June-2013]**
(a) Oxides of sulphur
(b) Oxides of nitrogen and unburnt hydrocarbons
(c) Carbon monoxide and SPM
(d) Oxides of sulphur and ozone

23. Which of the following nations has the maximum per capita emissions of carbon di-oxide ? **[September-2013]**
(a) China (b) Japan (c) India (d) Russia

24. Which activity contributes to water pollution more than any other throughout world ? **[September-2013]**
(a) Agriculture
(b) Hydroelectric power generation
(c) Industry
(d) Urbanisation

25. The phrase 'tragedy of commons' is in the context of **[June-2013]**
(a) tragic event related to damage caused by release of poisonous gases.
(b) tragic conditions of poor people.
(c) degradation of renewable free access resources.
(d) climate change.

26. The major source of the pollutant gas, carbon mono-oxide (CO), in urban areas is **[December-2013]**
(a) Thermal power sector (b) Transport sector
(c) Industrial sector (d) Domestic sector

27. Which one of the following is not a matter a global concern in the removal of tropical forests? **[December-2013]**
(a) Their ability to absorb the chemicals that contribute to depletion of ozone layer.
(b) Their role in maintaining the oxygen and carbon balance of the earth.
(c) Their ability to regulate surface and air temp-eratures, moisture content and reflectivity.
(d) Their contribution to the biological diversity of the planet.

28. Which one of the following green house gases has the shortest residence time in the atmosphere? **[June-2014]**
(a) Chlorofluorocarbon (b) Carbon dioxide
(c) Methane (d) Nitrous oxide

29. The population of India is about 1.2 billion. Take the average consumption of energy per person per year in India as 30 Mega Joules. If this consumption is met by carbon based fuels and the rate of carbon emissions per kilojoule is 15 × 106 kgs, the total carbon emissions per year from India will be **[June-2014]**
(a) 54 million metric tons
(b) 540 million metric tons
(c) 5400 million metric tons
(d) 2400 million metric tons

30. In terms of total CO_2 emissions from a country, identity the correct sequence : **[December-2014]**
(a) U.S.A. > China > India > Russia
(b) China > U.S.A. > India > Russia
(c) China > U.S.A. > Russia > India
(d) U.S.A. > China > Russia > India

31. One of the anthropogenic sources of gaseous pollutants chlorofluorocarbons (CFCs) in air is **[December-2014]**
(a) Cement Industry (b) Fertiliser industry
(c) Foam industry (d) Pesticide industry

32. India's contribution to total global carbon dioxide emissions is about : **[June-2015]**
(a) ~ 3% (b) ~ 6% (c) ~ 10% (d) ~ 15%

33. Which of the following pollutants can cause cancer in humans? **[December-2015]**
(a) Pesticides (b) Mercury
(c) Lead (d) Ozone

34. Inside rural homes, the source/sources of Nitrogen Oxide Pollution may be : **[December-2015]**
(A) Unvented gas stoves (B) Wood stoves
(C) Kerosene heaters
Choose the correct code :
(a) (A) and (B) only (b) (B) and (C) only
(c) (B) only (d) (A), (B) and (C)

35. Identify the air pollutant in urban areas which irritates eyes and also respiratory tract of human beings. **[July-2016]**
(a) Particulate matter (b) Oxides of nitrogen
(c) Surface ozone (d) Carbon monoxide

36. Which of the following is the largest source of water pollution in major rivers of India? **[July-2016]**
(a) Untreated sewage
(b) Agriculture run-off
(c) Unregulated small scale industries
(d) Religious practices

37. As part of Intended Nationally Determined contributions, Indian government through additional forest and tree cover has resolved to create an additional carbon sink (in terms of carbon dioxide equivalent) by year 2030 to the extent of **[August-2016]**
(a) 3.5 to 4 billion tons (b) 2.5 to 3 billion tons
(c) 1.5 to 2 billion tons (d) 1 to 1.5 billion tons

38. The arsenic pollution in ground water in Bangladesh and parts of India is due to **[August-2016]**
(a) industrial waste (b) thermal power plants
(c) natural sources (d) agricultural practices

39. Which of the following is not a water-brone disease ? **[January-2017]**
(a) Typhoid (b) Hepatitis
(c) Cholera (d) Dengue

40. The dominant source of pollution due to oxides of nitrogen (NO_X) in urban areas is **[January-2017]**
(a) road transport (b) commercial sector
(c) energy use in industry (d) power plants

41. Which of the following pollutant gases is not produced both naturally and as a result of industrial activity ? **[November-2017]**
(a) Chlorofluoro carbons (b) Nitrous oxide
(c) Methane (d) Carbon dioxide

42. Which of the following pollutants is the major cause of respiratory diseases ? **[November-2017]**
(a) Suspended fine particles (b) Nitrogen oxides
(c) Carbon monoxide (d) Volatile organic compounds

43. Which of the following is considered as major source of pollution in rivers of India ? **[July-2018]**
(a) Unregulated small scale industry
(b) Untreated sewage
(c) Agricultural run-off
(d) Thermal power plants

44. 'Fly ash' produced in thermal power plants is an ecofriendly resource for use in : **[July-2018]**
(a) agriculture as micro-nutrient
(b) wasteland development
(c) dam and water holding structures
(d) brick industry
Choose the correct answer from the code given below :
(a) (a), (b) and (d) only (b) (b), (c) and (d) only
(c) (a), (c) and (d) only (d) (a), (b), (c) and (d)

45. In the formation of Surface Ozone, which of the following do play an important role?
(A) Oxides of nitrogen (B) Oxides of sulphur
(C) Sunlight (D) Carbon monoxide
Choose the correct answer from the code given below: **[21st June 2019-Ist Shift]**
(a) (A), (B), (C) (b) (B), (C), (A)
(c) (A), (C), (D) (d) (A), (B), (D)

46. How many National Missions of Indian Government are there to address the problem of climate change? **[21st June 2019-IInd Shift]**
(a) 6 (b) 8 (c) 12 (d) 17

47. Which pollutant is the major source of marine pollution? **[24th June 2019-IInd Shift]**
(a) Agricultural run-off (b) Oil spill
(c) Industrial waste water (d) Sewage

48. Which of the following pollutants is included in the Air Quality Index in India? **[25th June 2019-Ist Shift]**
(a) Carbon Dioxide (b) Chlorofluoro carbons
(c) Sulphur dioxide (d) Methane

49. Which of the following is considered as a secondary air pollutant? **[25th June 2019-IInd Shift]**
(a) Nitric oxide (b) Ozone
(c) Sulphur dioxide (d) Carbon monoxide

50. Taj Mahal is mainly threatened by the deleterious effects of: **[26th June 2019-Ist Shift]**
(a) Sulphur dioxide (b) Chlorine
(c) Oxygen (d) Hydrogen

51. In large parts of Eastern India, the ground water is contaminated by: **[26th June 2019-Ist Shift]**
(a) Arsenic (b) Lead
(c) Mercury (d) Nickel

52. Which of the following is non-vehicular pollutant? **[26th June 2019-IInd Shift]**
(a) chlorofluorocarbon (b) carbon-monoxide
(c) hydrocarbon (d) particulate matter

53. Which of the following is the largest sink of CO_2 gas? **[26th June 2019-IInd Shift]**
(a) Forests (b) Oceans
(c) Ice sheets (d) Grasslands

54. Identity environmental issues which are local in nature : **[2nd Dec. 2019-Ist Shift]**
(i) Depletion of ozone layer (ii) Lake pollution
(iii) Soil erosion (iv) Climate change
(v) Water logging (vi) Solid Waste Management
Select the answer from the options given below:
(a) (ii), (iii) (v) and (vi) (b) (iii), (iv), (v) and (vi)
(c) (ii), (iii), (iv) and (v) (d) (i),(ii) (iii) and (iv)

55. Average noise levels in heavy traffic zones in major cities in India are generally in which of the following ranges of noise levels? **[2nd Dec. 2019-IInd Shift]**
(a) 31-40 dBA (b) 41-50 dBA
(c) 70-95 dBA (d) 110-120 dBA

56. Which of the following air pollutants are produced from room deodorizers ? **[3rd Dec. 2019-IInd Shift]**
(a) Inhalable particulate matter
(b) Carbon monoxide
(c) Ozone
(d) Volatile organic compounds

57. The most dominant source of Benzene emissions in ambient air is **[4th Dec. 2019-Ist Shift]**
(a) Cement industry (b) Cigarettes
(c) Car exhausts (d) Paints and varnish

58. The most important pollutants that cause degradation of water quality in rivers and streams are **[4th Dec. 2019-Ist Shift]**
(A) Bacteria (B) Nutrients
(C) Metals (D) Total dissolved solids
(E) Algae
Choose the most appropriate answer from the options given below :
(a) (A), (B) and (C) (b) (A), (B) and (D)
(c) (A), (B), (D) and (E) (d) (A), (B),(C), (D) and (E)

59. Match the following soil orders with their descriptions **[4th Dec. 2019-IInd Shift]**

(A) Histosols	(i)	Soil order that includes soils formed on volcanic ash
(B) Andisols	(ii)	Soil order of cold regions including soils underlain by permafrost
(C) Gelisols	(iii)	Soil order consisting of soils of dry climates
(D) Aridsols	(iv)	Soil order consisting of soils with a thick upper layer of organic matter.

Choose the correct option from those given below :
(a) (A)-(iv),(B)-(i), (C)-(ii), (D)-(iii)
(b) (A)-(ii),(B)-(iv), (C)-(i), (D)-(iii)
(c) (A)-(i), (B)-(ii), (C)-(iii), (D)-(iV)
(d) (A)-(i), (B)-(ii), (C)-(iv), (D)-(iii)

60. Noise levels at a traffic site are recorded for one hour at a sampling interval of 1 second and percentile indices of noise L1, L10, L50, L90 are computed from the data. The indices are then arranged in increasing order in terms of their values starting from minimum to maximum. Which of the following options represents their correct order?
[5th Dec. 2019-Ist Shift]
(a) L1, L10, L50, L90 (b) L10, L50, L90, L1
(c) L50, L90, L10, L1 (d) L90, L50, L10, L1

61. Consider the following statements regarding noise pollution: **[5th Dec. 2019-IInd Shift)]**
(A) Noise levels decrease as we move away from the source of noise
(B) Materials with high surface/mass density act as good noise barriers
(C) Sound pressure of 2 Pa corresponds to a noise of zero decibel
Choose the correct option from those given below:
(a) (A) and (B) only (b) (B) and (C) only
(c) (A) and (C) only (d) (A), (B) and (C)

62. Which of the two following is the correct sequence of greenhouse gases according to their relative global warming potential in increasing order? **[5th Dec. 2019-Ist Shift]**
(a) Nitrous oxide, Methane, Carbon dioxide, Chlorofluorocarbons
(b) Carbon dioxide, Methane, Nitrous oxide, Chlorofluorocarbons
(c) Methane, Nitrous oxide, Carbon dioxide, Chlorofluorocarbons
(d) Carbon dioxide, Nitrous oxide, Methane, Chlorofluorocarbons

63. Consider the following statements:
[5th Dec. 2019-IInd Shift]
(A) Earth would be safer without greenhouse effect
(B) Major contribution to the greenhouse efi'ect comes from carbon dioxide
(C) Earth's climate was changing even before man appeared on earth
Which of the above statements are correct?
(a) (A) and (B) only (b) (B) and (C) only
(c) (A) and (C) only (d) (A), (B) and (C)

64. Suppose the concentration of Carbondioxide, a green-house gas responsible for climate change, is 400 ppm. What is its concentration in air in percentage terms?
[6th Dec. 2019-IInd Shift]
(a) 0.04% (b) 0.4%
(c) 0.004% (d) 4.0%

65. In the recently launched Air Quality Index in India, which of the following pollutants is not included?
[6th Dec. 2019-IInd Shift]
(a) Carbon monoxide (b) Fine particulate matter
(c) Ozone (d) Chlorofluorocarbons

66. One of the parameters used to characterise the air quality at a location is $PM_{2.5}$. Here, the suffix '2.5' refers to
[26th June 2019-IInd Shift]
(a) average number of suspected particles in 1.0 cm^3 of air
(b) size of suspended particles in certain units
(c) concentration of oxides of sulphur and nitrogen
(d) concentration of suspended particles in 2.5 m^3 of air

67. Methane, a greenhouse gas, is emitted from
[3rd Dec. 2019-Ist Shift]
(i) landfills (ii) construction debris
(iii) wet lands (iv) e-waste
Choose the correct statements from the options given below:
(a) (i), (ii) and (iv) (b) (i), (iii) and (iv)
(c) (i) and (iii) only (d) (i) and (iv) only

HINTS & EXPLANATION

1. (d) Since the Tropic of Capricorn is the circle of latitude that contains the subsolar point on the December (or southern) solstice, it is the southernmost latitude where the Sun can be directly overhead. Its northern equivalent is the Tropic of Cancer. Hence, global warming during winter becomes more pronounced at the Tropic of Capricorn.

2. (c) Chromium occurs in the environment largely in two forms: trivalent chromium (chromium 3), which is an essential human nutrient, and hexavalent chromium (chromium 6), which is the most toxic form of the element.

3. (c) Barren sandy soils without clay factor are common in coastal regions of Orissa, Tamil Nadu and Kerala. The desert soils consist of aeolian sand (90 to 95 per cent) and clay (5 to 10 per cent).

4. (a) Both (A) and (R) are true, and (R) is the correct explanation of (A).

5. (a) The urbanization process accounts for the wind in the urban centers during nights to remain faster than that in rural areas.

6. (a)

Water Quality	pH Value
Neutral	7
Moderately acidic	4
Alkaline	5
Injurious	8

7. (b) Sea level rise is caused primarily by two factors related to global warming: the added water from melting ice sheets and glaciers and the expansion of seawater as it warms.

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8. (c) Chemical weathering of rocks is largely dependent upon heavy rainfall.

9. (a) The decibel (dB) is used to measure sound level, but it is also widely used in electronics, signals and communication. The dB is a logarithmic way of describing a ratio. The ratio may be power, sound pressure, voltage or intensity or several other things.

10. (*) All options are wrong. The commonly stated range of human hearing is 20 Hz to 20 kHz. ... Humans are most sensitive to (i.e. able to discern at lowest intensity) frequencies between 2,000 and 5,000 Hz. Hence, all options are wrong.

11. (d) Environmental impact assessment is an objective analysis of the probable changes in physical characteristics of the environment, biophysical characteristics of the environment, socio-economic characteristics of the environment, etc.

12. (a) Photovoltaic generation is a technology that directly converts solar energy to electric energy through the use of cells with monosilica and polycrystalline surfaces that act as semi-conductors. The technological advances have reduced the cost of energy produced by photovoltaic panels by five times since 1976.

13. (d) Sunderlal Bahuguna is a noted Garhwali environmentalist and Chipko movement leader. The idea of Chipko movement was of his wife and the action was taken by him.

14. (a) For drinking water, the maximum concentration level set by EPA is 500 mg/L. When TDS levels exceed 1000mg/L it is generally considered unfit for human consumption.

15. (a) Transport sector is the main contributor of air pollution in mega cities of India.

16. (a) Some of the most important sources of land or soil pollution are: 1. Domestic and Municipal Wastes; 2. Industrial and Mining Wastes; 3. Agricultural Wastes; 4. Radioactive Materials and Biological Agents.

17. (b) Chlorofluorocarbons, commonly known as CFCs, are a group of man-made compounds containing chlorine, fluorine and carbon. The production of CFCs began in the 1930s for the purpose of refrigeration. They are extensively utilised as propellants in aerosols, as blowing agents in foam manufacture and in air conditioning.

18. (c) Chlorofluorocarbons are compounds that were used as refrigerants in air conditioning systems and refrigerators. These compounds were hailed as a major breakthrough in safety because the first refrigeration systems used ammonia or sulfur dioxide as refrigerants.

19. (d) Density is not used as a pollution indicator in water.

20. (a) Biomagnifications means increase in the concentration of pollutants in living organisms.

21. (a) Methane is emitted from agriculture and fossil fuel use, as well as natural sources such as microbes in saturated wetland soils. It is a powerful greenhouse gas, and in the short term it does much more damage than the far more abundant carbon dioxide.

22. (b) Classic smog results from large amounts of coal burning in an area and is caused by a mixture of smoke and sulfur dioxide. This is a noxious mixture of air pollutants including Nitrogen Oxides, Tropospheric Ozone and Volatile Organic Compounds (VOCs). All of these chemicals are usually highly reactive and oxidizing.

23. (c) Countries' Share of CO_2 Emissions

2015 total emissions country rank	Country	2015 total carbon dioxide emissions from fuel combustion (million metric tons)	2015 per capita carbon dioxide emissions from fuel combustion (metric tons)
1	China	9040.74	6.59
2	United	4997.50	15.53
3	India	2066.01	1.58
4	Russia	1468.99	10.19
5	Japan	1141.58	8.99

24. (a) Agricultural pollution is the main source of pollution in water and lakes. Chemicals from fertilizers and pesticides make their way into the groundwater that end up in drinking water. Agricultural practices may also have negative impacts on water quality.

25. (c) The phrase 'tragedy of commons' is in the context of degradation of renewable free access resources.

26. (b) The major source of the pollutant gas, carbon mono-oxide (CO), in urban areas is transport sector.

27. (a) Their ability to absorb the chemicals that contribute to depletion of ozone layer.

28. (c) Average residence time of carbon dioxide is 30–95 years, methane is 12 years, CFC is 45 years and nitrous oxides is 114 years.

29. (*) All options are wrong.

30. (b) **Country's Share of CO_2 Emissions–**
The correct sequence in terms of total CO_2 Emissions –

2015 total emissions rank	Country	2015 total carbon dioxide emissions from fuel combustion million metric tons
1.	China	4997.50
2.	United States	9040.74
3.	India	2066.01
4.	Russia	1468.99

31. (c) One of the anthropogenic sources of gaseous pollutants chlorofluorocarbons (CFCs) in air is foam industry.

32. (b) India's contribution to total global carbon dioxide emissions is about ~ 6%.

33. (b) The U.S. Environmental Protection Agency (EPA) has determined that methylmercury is a possible human carcinogen.

34. (d) In typical Indian rural homes, the sources of Nitrogen Oxide Pollution are - Unvented gas stoves ,Wood stoves, Kerosene heaters, etc.

35. (c) Ground level ozone is not emitted directly into the air, but is created by chemical reactions between oxides of nitrogen (NOx) and volatile organic compounds (VOC).

This occurs when pollutants emitted by cars, power plants, industrial boilers, refineries, chemical plants, and other sources chemically react in the presence of sunlight. Ozone at ground level is a harmful air pollutant and it is the main ingredient in "smog."

36. (a) The main source of water pollution in India is untreated sewage. There are several other sources of pollution which include agricultural runoff and unregulated small scale industry.

37. (b) Indian government through additional forest and tree cover has resolved to create an additional carbon sink (in terms of carbon dioxide equivalent) by year 2030 to the extent of 2.5 to 3 billion tons.

38. (c) According to Oxy-hydroxide Reduction hypothesis, the origin of arsenic rich groundwater is due to a natural process, and it seems that thearsenic in groundwater has been present for thousands of years without being flushed from the delta.

39. (d) Dengue is not a water-borne disease; it is a mosquito-borne tropical disease caused by the dengue virus.

40. (a) The dominant source of pollution due to oxides of nitrogen (NOX) in urban areas is road transport.

41. (a) Chlorofluorocarbons. All others are the pollutants that are produced naturally while chlorofluorocarbons don't have any true natural source; they are produced as the result of side products of various things and reactions. These are the gases that contain chlorine fluorine and carbons. They can affect the environment greatly by pollution.

42. (a) Suspended fine particles is the major cause of respiratory diseases. Exposure to such particles can affect both lungs and heart. Numerous scientific studies have linked particle pollution exposure to a variety of problems including premature death with heart or lung diseases.

43. (b) Untreated sewage

As an effect of unprecedented population explosion, the largest cause of water pollution is untreated human waste. Agricultural run-off and effluents from thermal power plants and unregulated small scale industry are other major pollutants.

44. (d) (a), (b), (c) and (d)

Fly ash utilization reduces the requirement of clay, sand, lime stone in cement manufacturing and hence conserves natural resources. It reduces the cement requirement and hence carbon-dioxide liberation during cement manufacturing is reduced. It reduces the top soil requirement for land filling / brick manufacturing and saves agricultural land. It achieves increased strength of the finished concrete product without increasing the cement content.

When properly designed and constructed, the increased benefits of concrete made with 40, 50, and 60 percent fly ash replacement include dramatically reduced concrete permeability, and excellent resistance to all forms of premature deterioration.

Fly ash has great potential in agriculture due to its efficacy in modification of soil health and crop performance. The high concentration of elements (K, Na, Zn, Ca, Mg and Fe) in fly ash increases the yield of many agricultural crops. Fly ash can be used as a substitute for agricultural lime for treating acid soils.

45. (c) The majority of tropospheric ozone formation occurs when nitrogen oxides (NOx), carbon monoxide (CO) and volatile organic compounds (VOCs), such as xylene, react in the atmosphere in the presence of sunlight.

46 (b) National Action Plan on Climate Change was released by Indian Government on 30th June 2008 to address the future policies and programs for the climate mitigation and adaptation. The Government of India formulated national plan on water, renewable energy, energy efficiency agriculture and others – bundled with additional ones – into a set of eight missions under the National Action Plan on Climate Change.

47. (a) Marine pollution occurs when harmful effects result from the entry into the ocean of chemicals, particles, industrial, agricultural, and residential waste, noise, or the spread of invasive organisms. About 80% of marine litter comes from land-based sources (eg. through drains, sewage outfalls, industrial outfalls, direct littering) while 20% comes from marine-based activities such as illegal dumping and shipping for transport, tourism and fishing.

48. (c) Air Quality Index (AQI) is an index for reporting daily air quality. *Environmental Protection Agency* (EPA) calculates the AQI for five major air pollutants regulated by the Clean Air Act: ground-level ozone, particle pollution (also known as particulate matter), carbon monoxide, sulfur dioxide, and nitrogen dioxide.

49. (b) A **primary pollutant** is an air pollutant emitted directly from a source. A **secondary pollutant** is not directly emitted as such, but forms when other pollutants (primary pollutants) react in the atmosphere. Examples of a secondary pollutant include ozone, which is formed when hydrocarbons (HC) and nitrogen oxides (NOx) combine in the presence of sunlight; NO2, which is formed as NO combines with oxygen in the air; and acid rain, which is formed when sulfur dioxide or nitrogen oxides react with water.

50. (a) It is the acid rain which is caused by Sulphur dioxide is most dangerous for the Taj Mahal. This rain colors the Taj Mahal yellow.

51. (a) Ground water is an essential and vital component of our life support system. The ground water resources are being utilized for drinking, irrigation and industrial purposes. **Arsenic** is a naturally occurring element found in ground water. In India, seven states namely- West Bengal, Jharkhand, Bihar, Uttar Pradesh in the flood plain of the Ganga River; Assam and Manipur in the flood plain of the Brahmaputra and Imphal rivers and Rajnandgaon village in Chhattisgarh state have so far been reported affected by Arsenic contamination in groundwater above the permissible limit of 10 µg/L. People in these affected states have chronically been exposed to drinking Arsenic contaminated hand tube-wells water.

52. (a) Chlorofluorocarbons or CFCs (also known as Freon) are non-toxic, non-flammable and non-carcinogenic. They contain fluorine atoms, carbon atoms and chlorine atoms.

53. (b) The oceans are by far the largest carbon sink in the world. Some 93 percent of carbon dioxide is stored in algae, vegetation, and coral under the sea.

54. (a) The earliest environmental problems caused by people were local in nature. Lake Pollution, Soil erosion, Water logging, Deforestation, Noise pollution, Light pollution and Solid Waste Management are all examples of local environmental problems.

55. (c) Traffic noise is probably the most rigorous and pervasive type of noise pollution. It is one of the major environmental pollutants that are encountered in daily life and has direct effects on human performance. Noise levels are measured on the logarithmic scale with units of decibel (dB). The Average decibels (dB) of Heavy traffic, window air conditioner, noisy restaurant, power lawn mower are 80–89 dB. The sounds above 85 dB are very harmful.

56. (d) Room deodorizers or Air fresheners, even ones called green and organic, can emit potentially hazardous chemicals. Perfumes and similar products contain chemicals like phthalates. Air fresheners contain chemicals like formaldehyde, benzene and VOCs (Volatile Organic Compounds) that cause headache, asthma and even cancer in some cases.

57. (b) Benzene (C6H6) is a natural component of crude oil, and petrol contains 1–5% by volume. Cigarette smoke is an important source of benzene in indoor air. The most dominant source of Benzene emissions in ambient air have been found maximum in the homes of smokers (10.5 µg/m3) than those of non-smokers (7 µg/m3).

58. (a) Pollution of water occurs when substances that will modify the water in a negative fashion are discharged in it. The most important pollutants that cause degradation of water quality in rivers and streams are Bacteria, Metals and Nutrients. The sewage water carries harmful bacteria. Inorganic water pollutants include Heavy metals that come from motor vehicles. Thus infested with waste ranging from floating plastic bags to chemical waste, our water bodies have turned into a pool of poison.

59. (a)

60. (d) Noise pollution is a major problem for the quality of life in urban areas. L90 describes the level which exceeded for 90% of the time that is minimum value. Whereas L01 describes the level which exceeded for only 1% of the time, that is the maximum level. So arrangement become L90, L50, L10, L01.

61. (a) The power of the source remains unaffected but, as the distance increases the intensity of noise from the source decreases and is inversely proportional to square of the distance from the source. Hence statement (a) is correct. Since sound pleasure of 2 pa correspond to sound level of 100 decibel. So statement c is wrong.
Therefore option (a) is correct.

62. (b) The high global warming potential (GWP) greenhouse gases include hydro fluorocarbons (HFCs), per fluorocarbons (PFCs) and sulphur hexafluoride (SF_6). Like other GHGs, these gases trap heat in the atmosphere, but they are hundreds to thousands of times more effective at trapping heat, which leads to greater warming of the planet, compared to carbon dioxide (CO_2). The primary greenhouse gases in the atmosphere are water vapor, carbon dioxide, methane, nitrous oxide, and ozone. Water vapour accounts the largest greenhouse effect (90–85%). The CFCs, hydro fluorocarbons (HFCs), hydro chlorofluorocarbons (HCFCs), per fluorocarbons (PFCs), and sulphur hexafluoride (SF_6) are referred to as high-GWP gases, that is, GWP can be up to tens of thousands. For a given amount of mass, they hold substantially more heat than does CO_2.

63. (b) Without the greenhouse effect, the Earth's average temperature would be around -18 or -19 degrees **Celsius** (0 or 1 degree Fahrenheit). Earth would be locked in an ice age. Because of the greenhouse effect, the Earth's actual average temperature is 14 degrees Celsius (57 degrees Fahrenheit).
The gases in the atmosphere that absorb radiation are known as "greenhouse gases" (sometimes abbreviated as GHG). The most significant greenhouse gases are water vapour (H2O), carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O), according to the **Environmental Protection Agency** (EPA). The Earth's climate has changed throughout history. Just in the last 650,000 years there have been seven cycles of glacial advance and retreat, with the abrupt end of the last ice age about 11,700 years ago marking the beginning of the modern climate era — and of human civilization.

64. (a) concentration of CO_2 given is 400 pm
During conservation to percentage, 400/1000
Or 400/104 =0.04%

65. (d) It includes five main pollutants like air particulate, ground-level gas density, carbon monoxide gas content, sulphur dioxide content and gas content. Many countries monitor ground-level ozone, particulates, sulfur dioxide, carbon monoxide and nitrogen dioxide, and calculate air quality indices for these pollutants. The definition of the AQI in a particular nation reflects the discourse surrounding the development of national air quality standards in that nation.

66. (b) The term fine particles, or particulate matter 2.5 (PM2.5), refers to tiny particles or droplets in the air that are two and one half microns or less in width. The widths of the larger particles in the PM2.5 size range would be about thirty times smaller than that of a human hair. The smaller particles are so small that several thousand of them could fit on the period.

67. (c) Methane (CH_4) is one of the trace gases in the atmosphere that is considered to play a major role in greenhouse effect. Natural wetlands; paddy rice fields; emission from livestock production systems; biomass burning ; anaerobic decomposition of organic waste in landfills; and fossil are the main sources of Methane (CH_4).

CHAPTER 40

Impacts of Pollutants on Human Health

Major Pollutants of Air

Pollutants	Primary sources	Significant Effects
SO_2	Vehicular combustion, fossil burning	Acid rain, irritation in eyes, premature falling of leaves
CO and CO_2	Vehicular combustion, burning of fuels and hydrocarbons	Global warming, green house effect, CO has great affinity for haemoglobin and forms carboxy haemoglobin
Smoke, fly ash and soot	Thermal power stations	Respiratory diseases.
Lead and mercury	Autoexhaust from gasoline (petrol), paints, storage batteries. Fossil fuel like coal burning.	Affects the nervous system and circulatory system, brain damage
CFCs (Chloro fluoro Carbons)	Refrigerants and aerosol	Kidney damage and ozone depletion.

Major Pollutants of Water

Pollutants	Primary sources	Significant Effects
Pesticides and insecticides	Improper use in agriculture like DDT, BHC, mosquito repellants	Toxic to fishes, predatory birds and mammals
Plastics	Homes and industries	Kills fishes and animals. Persists in the environment because of non-biodegrability.
Chlorine compounds	Water disinfection with chlorine, paper industries and bleaching powder	Fatal for plankton (organisms floating on the surface of water), foul taste and odour, can cause Cancer in humans.
Lead paints	Leaded gasoline	Toxic to organisms
Mercury	Natural evaporation and dissolved industrial wastes, fungicides	Highly toxic to humans
Acids Mine drainage, industrial wastes	Mine drainage, industrial wastes	Kills organisms
Sediments	Natural errosion, run off from factories mining and construction activities, fertilizer and other	Reduces ability of water to assimilate oxygen.

SOUND/ NOISE POLLUTION

In India, the **Air (Prevention and control of pollution) Act** came into force in 1981 and in 1987 it was amended to include Noise as an Air pollutant.

Unwanted sounds created by humans, animals and machines which disturbs the environment and humans is called as sound pollution. The word noise comes from the Latin word *nausea* meaning *seasickness*.

SOIL POLLUTION

Soil is a thin layer of organic and inorganic materials that covers the Earth's rocky surface. Soil pollution is defined as the 'addition of substances to the soil, which adversely affect physical, chemical and biological properties of soil and reduces its productivity.' It is build-up of persistent toxic compounds, chemicals, salts, radioactive materials, or disease causing agents in soil which have adverse effects on plant growth, human and animal health.

A soil pollutant is any factor which deteriorates the quality, texture and mineral content of the soil or which disturbs the biological balance of the organisms in the soil.

THERMAL POLLUTION

- Power plants- thermal and nuclear, chemical and other industries use lot of water (about 30 % of all abstracted water) for cooling purposes and the used hot water is

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discharged into rivers, streams or oceans. The waste heat from the boilers and heating processes increases the temperature of the cooling water. Discharge of hot water may increase the temperature of the receiving water by 10 to 15 °C above the ambient water temperature.

RADIOACTIVE POLLUTION

Radioactive pollution is the increase in over the natural background radiation. There are many sources of radioactive pollution such as nuclear wastes from nuclear power plants, mining and processing of nuclear material etc. The worse case of nuclear pollution was the Chernobyl disaster in Russia occurred in 1986 but the effects still longer today.

SOLID WASTE

Solid waste refers to the non-liquid waste materials arising from domestic (*garbage debris* and night soil) activities, trade and commercial activities (hazardous and non-hazardous) industrial activities, agricultural activities, mining and public services (office and hospital wastes). Solid waste management is one of the major challenges faced by many countries around the globe. Inadequate collection, recycling or treatment and uncontrolled disposal of waste in dumps can lead to severe hazards, such as *health risks* and *environmental pollution*.

E-waste : "E-waste" is a popular, informal name for electronic products nearing the end of their "useful life. "E-wastes are considered dangerous, as certain components of some electronic products contain materials that are hazardous, depending on their condition and density.

Management of E-waste

It is estimated that 75% of electronic items are stored due to uncertainty of how to manage it. These electronic junks lie unattended in houses, offices, warehouses etc. and normally mixed with household wastes, which are finally disposed off at landfills. This necessitates implementable management measures.

In industries management of e-waste should begin at the point of generation, this can be done by waste minimization techniques and by sustainable product design. Waste minimization in industries involves adopting:

- inventory management,
- production-process modification,
- volume reduction,
- recovery and reuse.

RADIOACTIVE WASTE

Radioactive waste which arises from civil nuclear activities as well as from defense related nuclear weapon activities, poses a terrible problem for handling and keeping the environment to be safe to the present and future generations. The techniques used emphasizes on waste minimization and volume reduction. Nuclear waste is categorized into high, intermediate and low levels depending on the level of radioactivity in it.

PLASTIC WASTE

Plastics have become an indispensable part of our daily lives. Invented in 1935, they are wonderful products of polymer chemistry produced from the by- products of petroleum refining. They are classified as into two main categories:

- **Thermoplastics**
- **Thermosetting plastics**

EXERCISE

1. With absorption and decomposition of CO_2 in ocean water beyond desired level, there will be: **[December-2006]**
(a) decrease in temperature
(b) increase in salinity
(c) growth of phytoplankton
(d) rise in sea level

2. Maximum soot is released from **[December-2009]**
(a) Petrol vehicles (b) CNG vehicles
(c) Diesel vehicles (d) Thermal Power Plants

3. Surface Ozone is produced from **[December-2009]**
(a) Transport sector (b) Cement plants
(c) Textile industry (d) Chemical industry

4. Climate change has implications for **[June-2010]**
1. soil moisture 2. forest fires
3. biodiversity 4. ground water
Identify the correct combination according to the code :
Codes :
(a) 1 and 3 (b) 1, 2 and 3
(c) 1, 3 and 4 (d) 1, 2, 3 and 4

5. The constituents of photochemical smog responsible for eye irritation are **[December-2010]**
(a) SO_2 and O_3 (b) SO_2 and NO_2
(c) HCHO and PAN (d) SO_2 and SPM

6. **Assertion (A) :** Some carbonaceous aerosols may be carcinogenic. **[December-2010]**
Reason (R) : They may contain polycyclic aromatic hydrocarbons (PAHs).
(a) Both (A) and (R) are correct and (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct but (R) is not the correct explanation of (A).
(c) (A) is correct, but (R) is false.
(d) (A) is false, but (R) is correct.

7. Chromium as a contaminant in drinking water in excess of permissible levels, causes **[June-2011]**
(a) Skeletal damage
(b) Gastrointestinal problem
(c) Dermal and nervous problems
(d) Liver/Kidney problems

8. The main precursors of winter smog are **[June-2011]**
(a) N_2O and hydrocarbons (b) NO_X and hydrocarbons
(c) SO_2 and hydrocarbons (d) SO_2 and ozone

9. Which of the following pollutants affects the respiratory tract in humans? **[December-2011]**
(a) Carbon monoxide (b) Nitric oxide
(c) Sulphur di-oxide (d) Aerosols

10. Irritation in eyes is caused by the pollutant **[June-2012]**
(a) Sulphur di-oxide (b) Ozone
(c) PAN (d) Nitrous oxide

11. The primary source of organic pollution in fresh water bodies is **[June-2014]**
(a) run-off urban areas
(b) run-off from agricultural forms
(c) sewage effluents
(d) industrial effluents

12. Which of the following cities has been worst affected by urban smog in recent times? **[June-2014]**
(a) Paris (b) London
(c) Los Angeles (d) Beijing

13. Among the following air pollutants which directly impacts human health as well as climate? **[August-2016]**
(a) Soot (b) Sulphur dioxide
(c) Oxides of nitrogen (d) Chlorofluoro carbons

14. What is the long term effect of cutting down larger areas of rain forests? **[December-2018]**
(a) Decreased carbon dioxide content in the air
(b) Increased rate of soil erosion
(c) Increased rainfall in these areas
(d) Decreased flooding of low-lying land

15. With increase in temperature, the dissolved oxygen content in a water body will: **[20th June 2019-Ist Shift]**
(a) decreases
(b) increases
(c) remain constant
(d) may increase or decrease depending on the temperature range

16. **Assertion (A):** Methemoglobinemia is a condition in which blood is not able to carry and deliver enough oxygen to the body.
Reason (R): Consuming drinking water with high nitrate levels may cause methemoglobinemia.
Choose the correct answer from the options given below: **[24th June 2019-Ist Shift]**
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

17. **Assertion (A):** High concentration of ozone in the troposphere is desirable. **[24th June 2019-Ist Shift]**
Reasons (R): Ozone present in the atmosphere protects the living organisms on the surface of earth from the harmful ultraviolet radiation of the sun.
Choose the correct answer from the options given below:
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) true but (R) is not the correct explanation of (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

18. Blue – baby syndrome can happen due to excess of which component in water? **[25th June 2019-Ist Shift]**
(a) Calcium (b) Magnesium
(c) Nitrates (d) Pesticides

19. Which of the following diseases are due to polluted water? **[26th June 2019-IInd Shift]**
(1) Giardia (2) Dengue
(3) Amoebiasis (4) Typhoid
Choose the correct answer from the options given below:
(a) (1), (2) and (4) (b) (2), (3) and (4)
(c) (1), (2), (3) and (4) (d) (1), (3) and (4)

20. Exposure to noise pollultion can cause **[3rd Dec. 2019-IInd Shift]**
(A) Weakening of immune system
(B) Sleeplessness
(C) Speech interference
(D) Increase in blood pressure
(E) Shift in threshold of hearing
(F) Respiratory problems
Choose the correct option from those given below :
(a) (A), (B), (C), (E) and (F)
(b) (B), (C), (D) and (E)
(c) (B), (C), (D), (E) and (F)
(d) (A), (B), (C), (D), (E) and (F)

21. Match the following classes of chemicals with their descriptions; **[5th Dec. 2019-Ist Shift]**

(Chemical Class)	(Description)
(A) Allergens	(i) Chemicals that alter or damage the genetic material (DNA) cells
(B) Mutageus	(ii) Substances that activate the immune system
(C) Carcinogens	(iii) Chemicals that specifically cause abnormalities during embryouics growth and development.
(D) Teratogens	(iv) Substances that cause invasive out control cell growth resulting in malignant tumors.

Choose the most appropriate option from those given below:
(a) (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii) (b) (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)
(c) (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii) (d) (a)-(iii), (b)-(i), (c)-(ii), (d)-(iv)

22. Schistosomiasis, a common water contact disease, is spread by which of the following? **[5th Dec. 2019-IInd Shift]**
(a) Giardia (b) E. Cali
(c) Cercaria (d) Amoeba

23. Identify the correct group of diseases caused by polluted water **[6th Dec. 2019-IInd Shift]**
(a) Cholera, Acute Diarrhoea, Typhoid and Polio
(b) Cholera, Typhoid, Enteritis and Tuberculosis
(c) Typhoid, Enteritis and Tuberculosis
(d) Cholera, Acute Diarrhoea, Typhoid and Tuberculosis

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HINTS & EXPLANATION

1. **(c)** Phytoplankton growth depends on the availability of carbon dioxide, sunlight, and nutrients. Phytoplankton, like land plants, require nutrients such as nitrate, phosphate, silicate, and calcium at various levels depending on the species.
2. **(d)** Maximum soot is released from thermal power plants.
3. **(a)** Surface Ozone is produced from transport sector.
4. **(d)** Climate change has implications for all these - soil moisture, forest fires, biodiversity and ground water.
5. **(b)** The constituents of photochemical smog responsible for eye irritation are SO_2 and NO_2.
6. **(a)** Both (A) and (R) are correct and (R) is the correct explanation of (A).
7. **(c)** Chromium may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA). Chromium in drinking water in excess of permissible levels causes dermal and nervous problems.
8. **(c)** Smog is a type of air pollutant. This kind of visible air pollution is composed of nitrogen oxides, Hydrocarbons, sulphur oxides, ozone, smoke or dirt particles and also less visible particles such as CFC's.
9. **(a)** There are a number of triggers to asthma attacks that include dust, smoke, pollen, and volatile organic compounds. Common outdoor pollutant triggers include ozone, carbon monoxide, and nitrogen oxides.
10. **(c)** Peroxyacetyl nitrate (PAN) is a ubiquitous air pollutant formed from NO(2) reacting with acetoxy radicals generated from ambient aldehydes in the presence of sunlight and ozone. It contributes to eye irritation associated with photochemical smog and is present in most urban air.
11. **(c)** Organic pollutants originate from domestic sewage (raw or treated), urban run-off, industrial (trade) effluents and farm wastes. Sewage effluents is the greatest source of organic materials discharged to freshwaters.
12. **(d)** Los Angeles has been worst affected by urbanw2 smog in recent times.
13. **(a)** Several studies have been carried out to establish strong correlations between air pollutants (including PM) and increased prevalence of morbidities such as lung and skin cancers, child deformities, miscarriages, etc. Soot, also called black carbon (BC), contributes to climate warming.
14. **(b)** Deforestation can greatly increase the rate of erosion in a region. One of the most important barriers to erosion is plant life as long-lived trees and other species put down roots that literally help hold the soil together.
15. **(a)** Dissolved oxygen refers to the level of free, non-compound oxygen present in water or other liquids. It is an important parameter in assessing water quality because of its influence on the organisms living within a body of water. The actual amount of dissolved oxygen (in mg/L) will vary depending on temperature, pressure and salinity. The solubility of oxygen decreases as temperature increases. This means that warmer surface water requires less dissolved oxygen to reach 100% air saturation than does deeper, cooler water.
16. **(a)** Methemoglobinemia is a blood disorder in which an abnormal amount of methemoglobin is produced. Methemoglobin is a form of hemoglobin. With methemoglobinemia, the hemoglobin can carry oxygen, but is not able to release it effectively to body tissues. Methemoglobinemia is passed down through families (inherited or congenital) and it is also caused by the exposure to certain medicines, chemicals, or foods (acquired).
17. **(d)** Ozone occurs in two layers of the atmosphere. The layer closest to the Earth's surface is the troposphere. Here, ground-level or "bad" ozone is an air pollutant that is harmful to breathe and it damages crops, trees and other vegetation. It is a main ingredient of urban smog. Therefore high concentration in the lower troposphere is not desirable. Whereas when it meets to a level about 6 miles up, where it meets the second layer, the stratosphere it protects life on Earth from the sun's harmful ultraviolet (UV) rays.
18. **(c)** Blue Baby Syndrome, or methemoglobinemia, begins when large amounts of nitrates in water are ingested by an infant and converted to nitrite by the digestive system. The nitrite then reacts with oxyhemoglobin (the oxygen-carrying blood protein) to form metheglobin, which cannot carry oxygen.
    If a large enough amount of metheglobin is formed in the blood, body tissues may be deprived of oxygen, causing the infant to develop a blue coloration of their mucous membranes and possibly digestive and respiratory problems. This condition is also known as methemoglobinemia. The majority of cases have occurred when nitrate levels have been over 100 mg/litre.
19. **(d)** Giardia, Amoebiasis and typhoid are caused by drinking water or eating food washed in water which is polluted, contains protozoa that can cause infections like Amoebiasis, Giardiasis, toxoplasmosis, etc.
20. **(b)** Noise pollution takes place when there is either an excessive amount of noise or an unpleasant sound that causes a temporary disruption in the natural balance. Noise pollution can cause hypertension, high stress levels, tinnitus, hearing loss, sleep disturbances, and other harmful and disturbing effects.
21. **(c)** An *allergen* is a usually harmless substance capable of triggering a response that starts in the immune system and results in an allergic reaction. *Mutagens* are chemical compounds or forms of radiation that cause irreversible and heritable changes in the cellular genetic material, deoxyribonucleic acid (DNA). A carcinogen is any substance, radionuclide, or radiation that promotes carcinogenesis, the formation of cancer. *Teratogen* is an agent that can disturb the development of an embryo or fetus. *Teratogens* may cause a birth defect in the child.
22. **(c)** Schistosomiasis is a water-based disease which is considered the second most important parasitic infection after malaria in terms of public health and economic impact. Schistosomiasis, also known as bilharzia, is a disease caused by parasitic worms, the infectious form of the parasite, known as cercariae, emerge from the snail into the water.
23. **(a)** Contaminated water can cause many types of diarrheal diseases, including Cholera, and other serious illnesses such as Guinea worm disease, Typhoid, Polio and Dysentery.

CHAPTER 41

Natural and Energy Resources

1. Renewable Sources of Energy

Renewable sources of energy are those which can be generated by us or which are constantly being generated by natural processes or whose supply is unlimited. Examples : The sun, wind, flowing water, etc.

2. Non-renewable Sources of Energy

Non-renewable sources of energy are those which were produced in the past by natural processes, whose supply is limited and which we cannot generate again in short interval of time, these will be exhausted in future. Examples : Coal, petroleum, natural gas, etc.

CONVENTIONAL SOURCES OF ENERGY

The sources of energy which are extensively used by man due to their easy availability .

For example : Fossil fuels, wind energy, energy from biomass, etc.

Fossil Fuels: Fossil fuels are hydrocarbon based natural resources that were formed over 300 hundred millions of years ago by the fossilization of prehistoric plants and animals. There are three major forms of fossil fuels: coal, oil and natural gas.

Bio-Mass: Biomass is a renewable energy source because the energy it contains comes from the sun. Through the process of photosynthesis, chlorophyll in plants captures the sun's energy and converting carbon dioxide from the air and water from the ground into carbohydrates, complex compounds composed of carbon, hydrogen, and oxygen. When these carbohydrates are burned, they turn back into carbon dioxide and water and release the sun's energy they contain. In this way, biomass functions as a sort of natural battery for storing solar energy.

Bio-Gas: Bio-gas is made from organic waste matter after it is decomposed. The decomposition breaks down the organic matter, releasing various gases. The main gases released are methane, carbon dioxide, hydrogen and hydrogen sulphide.

Wind Energy: Along with sun, it was the air, which showed man its power. Even before the solar energy, it was the wind energy that man used for his work. Initially, it was used in two main ways; to drive wind mills on land and to drive sailboat at sea. The first use of windmills were to grind food grains and to run pumps to irrigate.

Solar Energy: The energy obtained from the sun is called solar energy. The inner temperature of the sun is very high (10^7K). At this high temperature the nucleus of hydrogen atoms present in the sun fuse to convert into heavy nucleus of helium. A lot of energy is released in this nuclear reaction. Sun is the biggest source of energy. Energy of the sun reaching every year on earth is about 1.6×10^8 KWh (Kilo watt hour).

Tidal Energy: Tide arise due to the gravitational pull of mainly the moon on the water and spinning earth. The tide moves a huge amount of water twice each day, and harnessing it could provide a great deal of energy. Tide is the alternate rise and fall in the water level of oceans and seas. (i) It is an inexhaustible and renewable source of energy.

Wave Energy: Kinetic energy exists in the moving waves of the ocean. Waves are a powerful source of energy. That energy can be used to power a turbine. There are several methods of getting energy from waves, but one of the most effective works like a swimming pool wave machine in reverse.

Ocean Thermal Energy: The energy from the sun heats the surface water of the ocean. In tropical regions, the surface water can be 40º celsius or more degrees warmer than the deep sea water. This temperature difference can be used to produce electricity.

Geothermal Energy: Energy present in the depth of the earth is called *geothermal energy*. Temperature in the earth at a distance of 10 kilometres is about 120°C and it increases to 300°C at the depth of 320 kilometres.

Nuclear Energy: Nuclear power is an alternative energy source that can be obtained from either the splitting of the bigger nucleus of atoms (nuclear fission) or the combining of the lighter nuclei of atoms (nuclear fusion). In either of these two reactions, great amounts of energy are released.

EXERCISE

1. The maximum loss of forest lands in India is caused by : **[December-2004]**
(a) River valley projects (b) Industries
(c) Means of transportation (d) Agriculture

2. Lunar eclipse occurs when **[June-2005]**
(a) The sun comes an between the Moon and the Earth
(b) The moon comes in between the earth and the sun
(c) The earth comes in between the sun and the moon
(d) None of the choices

3. Bitumen is obtained from : **[December-2005]**
(a) Forests and Plants (b) Kerosene oil
(c) Crude oil (d) underground mines

4. While all rivers of Peninsular India flow into the Bay of Bengal, Narmada and Tapti flow into the Arabian Sea because these two rivers: **[June-2006]**
(a) Follow the slope of these rift valleys
(b) The general slope of the Indian peninsula is from east to west
(c) The Indian peninsula north of the Satpura ranges, is tilted towards the west
(d) The Indian peninsula south of the satpura ranges is tilted towards east

5. Soils in the Mahanadi delta are less fertile than those in the Godavari delta because of: **[June-2006]**
(a) erosion of top soils by annual floods
(b) inundation of land by sea water
(c) traditional agriculture practices
(d) the derivation of alluvial soil from red-soil hinterland

6. The plume rise in a coal based power plant depends on: **[June-2007]**
(i) Buoyancy (ii) Atmospheric stability
(iii) Momentum of exhaust gases
Identify the correct code:
(a) (i) and (ii) only (b) (ii) and (iii) only
(c) (i) and (iii) only (d) (i), (ii) and (iii)

7. Structure of earth's system consists of the following: Match List-I with List-II and give the correct answer. **[June-2008]**

	List-I (Zone)	**List-II (Chemical Character)**
A	Atmosphere	(i) Inert gases
B	Biosphere	(ii) Salt, fresh water, snow and ice
C	Hydrosphere	(iii) Organic substances skeleton matter
D	Lithosphere	(iv) Light silicates

Codes:

	A	**B**	**C**	**D**
(a)	(ii)	(iii)	(i)	(iv)
(b)	(i)	(iii)	(ii)	(iv)
(c)	(ii)	(i)	(iii)	(iv)
(d)	(iii)	(i)	(ii)	(iv)

8. The tallest trees in the world are found in the region : **[December-2008]**
(a) Equatorial region (b) Temperate region
(c) Monsoon region (d) Mediterranean region

9. Fresh water achieves its greatest density at: **[December-2008]**
(a) –4º C (b) 0º C (c) 4º C (d) –2.5º C

10. Bog is a wetland that receives water from: **[June-2009]**
(a) nearby water bodies (b) melting
(c) rain fall only (d) sea only

11. The great Indian Bustard bird is found in **[December-2009]**
(a) Thar Desert of Rajasthan (b) Coastal regions of India
(c) Malabar Coast (d) Delta regions

12. The main constituents of biogas are **[June-2010]**
(a) Methane and Carbon di-oxide
(b) Methane and Nitric oxide
(c) Methane, Hydrogen and Nitric oxide
(d) Methane and Sulphur di-oxide

13. Dioxins are produced from **[June-2010]**
(a) Wastelands (b) Power plants
(c) Sugar factories (d) Combustion of plastics

14. Identify the correct sequence of energy sources in order of their share in the power sector in India : **[June-2011]**
(a) Thermal > nuclear > hydro > wind
(b) Thermal > hydro > nuclear > wind
(c) Hydro > nuclear > thermal > wind
(d) Nuclear > hydro > wind > thermal

15. Which of the following sources of energy has the maximum potential in India ? **[December-2011]**
(a) Solar energy (b) Wind energy
(c) Ocean thermal energy (d) Tidal energy

16. Ecological footprint represents **[December-2011]**
(a) area of productive land and water to meet the resources requirement
(b) energy consumption
(c) CO_2 emissions per person
(d) forest cover

17. Which of the following is not a renewable natural resource? **[June-2012]**
(a) Clean air (b) Fertile soil
(c) Fresh water (d) Salt

18. The second most important source after fossil fuels contributing to India's energy needs is **[December-2012]**
(a) Solar energy (b) Nuclear energy
(c) Hydropower (d) Wind energy

19. The percentage share of renewable energy sources in the power production in India is around **[June-2013]**
(a) 2-3% (b) 22-25% (c) 10-12% (d) < 1%

20. In a fuel cell driven vehicle, the energy is obtained from the combustion of **[December-2013]**
(a) Methane (b) Hydrogen (c) LPG (d) CNG

21. Consider the following statements and select the correct answer from the code given below: **[June-2014]**
i. Gujarat receives the highest solar radiation in the country.
ii. India has the fifth largest installed wind power in the world.
iii. The maximum amount of wind power is contributed by Tamil Nadu.
iv. The primary source of uranium in India is Jaduguda.
Codes :
(a) i and ii (b) i, ii and iii
(c) ii and iii (d) iii and iv

22. Which of the following is not a renewable natural resource? **[December-2014]**
(a) Clean air (b) Fresh water
(c) Fertile soil (d) Salt

23. Which of the following combinations represent renewable natural resources? **[June-2015]**
(a) Fertile soil, fresh water and natural gas
(b) Clean air, phosphates and biological diversity
(c) Fishes, fertile soil and fresh water
(d) Oil, forests and tides

24. In which of the countries per capita use of water is maximum? **[June-2015]**
(a) USA (b) European Union
(c) China (d) India

25. **Assertion (A) :** Conserving our soil resources is critical to human survival. **[July-2016]**
Reason (R) : Soil is home to many microorganisms and contains minerals.
Choose the correct code :
(a) Both (A) and (R) are correct and (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct but (R) is not the correct explanation of (A).
(c) (A) is true and (R) is false.
(d) (A) is false and (R) is true.

26. The percentage share of electrical power from solar energy in the total electric power generation from all renewable energy sources sought to be achieved by Indian government by the year 2022, is **[August-2016]**
(a) ~ 57.1% (b) ~ 65.5%
(c) ~ 47.5% (d) ~ 75%

27. Among the following fuels of energy, which is the most environment friendly ? **[November-2017]**
(a) Ethanol (b) Biogas
(c) CNG (d) Hydrogen

28. In terms of their contribution to the total power generation in India, identify the correct sequence of energy sources-Thermal Power Plants (TPP), Large Hydropower Projects (LHP), Nuclear Energy (NE) and Renewable Energy (RE) which includes solar energy, wind energy, biomass and small hydropower projects. **[July-2018]**
(a) TPP > RE > LHP > NE (b) TPP > LHP > RE > NE
(c) LHP > TPP > RE > NE (d) LHP > TPP > NE > RE

29. Consider the following statements: **[December-2018]**
(A) The radiational reflected back to the atmosphere is called albedo.
(B) The atmosphere is essential in maintaining the heat balance of the body.
(C) The heat and sunlight both pass through the atmosphere.
Which of the statement(s) given above is/are correct?
(a) Only (A) (b) (A), (B) and (C)
(c) (B) and (C) (d) (A) and (B)

30. Which are the examples of potential kinetic energy?
Select your answer from the options given below: **[21st June 2019-Ist Shift]**
(i) Water that is behind a dam
(ii) Radio signals
(iii) An airplane idling on the runway
(iv) A satellite before it is launched
(v) A coiled spring
(vi) Heat harnessed from the oceans
Option
(a) (i), (iii), (iv) and (v) (b) (i), (ii), (iii) and (vi)
(c) (ii), (iii) (iv) and (v) (d) (ii), (iv), (v)) and (vi)

31. A geothermal reserve has the stored best of 5×10^{19} J. If the over all efficiency of a geothermal power plant based on this reserve is 0.04, how much power can be produced by the plant in 1 year? **[21st June 2019-IInd Shift]**
(a) ~0.32 GW (b) ~0.64 GW
(c) ~2.62 GW (d) ~63.41 GW

32. Which of the following energy sources is used for conversion of energy in electricity generation? **[21st June 2019-IInd Shift]**
(a) Biomass (b) Air
(c) Geothermal (d) Nuclear

33. Which of the following materials is widely used in solar cell fabrication? **[21st June 2019-IInd Shift]**
(a) Nubidium (b) Silicon
(c) Nickel (d) Chromium

34. Algal blooms in oligotrophic lakes are: **[24th June 2019-Ist Shift]**
(a) very frequent (b) frequent
(c) very rare (d) widespread

35. Permafrost is defining characteristic of which biome? **[24th June 2019-IInd Shift]**
(a) Taiga (b) Tundra (c) Grassland (d) Desert

36. The mangroves exist in: **[24th June 2019-IInd Shift]**
(a) Fresh water system (b) Temperate areas
(c) Semi-arid areas (d) Saline waters

37. Amongst the following, which is better suited for dumping of nuclear waste? **[25th June 2019-IInd Shift]**
(a) Salt mines (b) Deserts
(c) Forests (d) Oceans

38. Indian government's target for share of renewable energy in the total installed capacity of electric power in India by the year 2030 is **[25th June 2019-IInd Shift]**
(a) 20% (b) 30% (c) 40% (d) 50%

39. Efficiency of electrical power generation is least amongst the following sources of energy in case of: **[26th June 2019-Ist Shift]**
(a) Solar (b) Wind (c) Geothermal (d) Nuclear

40. Choose the set of non-renewable resources **[26th June 2019-IInd Shift]**
(a) Uranium, natural gas, soil
(b) Natural gas, uranium, phosphates
(c) Petroleum, uranium, geothermal energy
(d) Shale gas, uranium, soil

41. A green building **[3rd Dec. 2019-Ist Shift]**
(i) uses minimum amount of energy
(ii) generates waste
(iii) consumes a lot of water
(iv) conserves natural resources
(v) creates space for healthy living
Choose the correct statements from the options given below:
(a) (i), (ii) and (iii) (b) (i), (iv) and (v)
(c) (ii), (iii) and (v) (d) (ii), (iv) and (v)

42. The share of which of the following sources of energy in electricity generation in India at present is the least? **[3rd Dec. 2019-Ist Shift]**
(a) Thermal (b) Solar and Wind
(c) Hydro (d) Nuclear

43. Which of the following statements are true about a fuel cell? **[4th Dec. 2019-IInd Shift]**
(A) It is a device that uses electrochemical reactions to produce electric current
(B) It consists of a positive electrode and a negative electrode separated by an electrolyte
(C) Just like batteries it needs to be recharged With an electric current
Choose the correct option from those given below:
(a) (A) and (B) only (b) (B) and (C) only
(c) (A), (B) and (C) (d) None

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44. Major Sources of oxygen demanding waste in fresh water systems are **[6th Dec. 2019-Ist Shift]**
A. Agricultural run-off B. Food Processing
C. Ore Mining D. Sewage euent
E. Landll sites
Choose the correct options from these given below:
(a) (A), (D) and (E) (b) (B), (D) and (E)
(c) (A), (B) and (D) (d) (A), (B), (C) and (D)

45. Which of the following is renewable natural resources? **[6th Dec. 2019-Ist Shift]**
(a) Biological University
(b) Tin'
(c) Natural Gas
(d) Salt

46. Biomass fuels have the potential to form a sustainable carbon neutral energy source because they **[6th Dec. 2019-Ist Shift]**
(a) Produce carbon dioxide in combustion as much as they consume when they grow
(b) Produce less amount of carbon dioxide on combustion compared to the amount they use during their growth
(c) Have carbon dioxide content same as fossil fuels
(d) Do not produce hazardous emissions on combustion

47. Identify the correct sequence of biomass fuels in terms of their energy content per unit mass **[6th Dec. 2019-IInd Shift]**
(a) Dung (dry) > Coconut Shells > Unsorted domestic refuse
(b) Unsorted domestic refuse > Coconut Shells > Dung (dry)
(c) Wood (dry) > Coconut Shells > Unsorted domestic refuse
(d) Coconut Shells > Dung (dry) > Unsorted domestic refuse

48. The potential of geothermal power in India is approximately **[3rd Dec. 2019-IInd Shift]**
(a) 10 GW (b) 5 GW
(c) 20 GW (d) 25 GW

49. Spread of forest fires is influenced by **[5th Dec. 2019-Ist Shift]**
(A) Slope (B) Soil Moisture
(C) Wind
Choose the correct answer from the options given below:
(a) (A) and (B) only (b) (B) and (C) only
(c) (A) and (C) only (d) (A), (B) and (C)

50. Which of the following is a biological method of disposal of Municipal Solid Waste? **[25th June 2019-Ist Shift]**
(a) Land filling (b) Pulverization
(c) Composting (d) Shredding

51. The target set by Indian government for generating power from wind energy by the year 2022 is: **[24th June 2019-IInd Shift]**
(a) 60 GW (b) 50 GW
(c) 40 GW (d) 15 GW

52. Which of the following sequence represent a correct order of soil particles arranged in terms of particle size from smaller to largest? **[4th Dec. 2019-IInd Shift**
(a) Graval, Silt, Clay, Sand
(b) Silt, Clay, Graval Sand
(c) Silt, Clay, Graval Sand
(d) Silt, Clay, Sand Graval

53. Oligotrophic lakes are characterized by: **[20th June 2019-Ist Shift]**
(a) High level of nutrients:
(b) Low level of nutrients
(c) Absence of nutrients
(d) High level of organic matter

54. In Social Sciences, a central issue is the question of whether the social World can be studied using the methods of natural sciences. This statement refers to the issue of : **[20th June 2019-Ist Shift]**
(a) Ontology (b) Axiology
(c) Epistemology (d) Etymology

HINTS & EXPLANATION

1. (d) The maximum loss of forest lands in India is caused by the agriculture.

2. (c) Lunar eclipse occurs when the earth comes in between the sun and the moon.

3. (c) Bitumen is not extracted; it is a final residue after distillation and processing of crude oil. Petroleum Bitumen, normally called "Bitumen" or "Asphalt" is produced by refining crude oil.

4. (a) Narmada and Tapti flow into the Arabian Sea because they follow the slope of these rift valleys.

5. (a) Soils in the Mahanadi delta are less fertile than those in the Godavari delta because of erosion of top soils by annual floods. This degrades the soil and causes the soil to become less and less fertile.

6. (b) The plume rise in a coal based power plant depends on atmospheric stability and momentum of exhaust gases.

7. (b) Atmosphere – Inert gases
Biosphere – Organic substances, skeleton matter, Atmosphere
Atmosphere – Hydrosphere
Lithosphere – Light silicate

8. (b) The world's tallest temperate region trees grow up to 30 metres taller than their tropical counterparts.

9. (c) When the ice melts to liquid water, the structure collapses and the density of the liquid increases. At temperatures well above freezing, the molecules move faster and get further apart. The density decreases as temperature increases. Thus, the density of water is a maximum at 4 °C.

10. (c) Bogs occur where the water at the ground surface is acidic and low in nutrients. In some cases, the water is derived entirely from precipitation, in which case they are termed ombrotrophic (cloud-fed).

11. (a) Great Indian Bustards in the Desert National Park, Jaisalmer, Rajasthan at the edge of the Thar desert.

12. (a) Biogas comprises primarily methane (CH_4) and carbon dioxide (CO_2) and may have small amounts of hydrogen sulphide (H_2S), moisture and siloxanes.

13. (d) Burning plastics can be especially problematic, with PVC plastic in particular contributing to high emissions of

dioxin. Burning these plastics can release dioxins.

14. (a) The correct sequence of energy sources in order of their share in the power sector in India is– Thermal > nuclear > hydro > wind.

15. (a) Solar power in India is a fast developing industry. The country's solar installed capacity reached 25.21 GW as of 31 December 2018. The International Solar Alliance (ISA), proposed by India as a founder member, is headquartered in India.

16. (a) The ecological footprint is the impact of human activities measured in terms of the area of biologically productive land and water required to produce the goods consumed and to assimilate the wastes generated.

17. (d) Salt, or sodium chloride, is a non-renewable resource. A resource is defined as renewable only if it is self-replenishing. While new salt is being formed by natural processes in the earth, the timescale for that formation is too vast for salt to be considered self-replenishing in terms of human use.

18. (c) The second most important source after fossil fuels contributing to India's energy needs is Hydropower.

19. (c) India is one of the largest producers of energy from renewable sources. In the electricity sector, renewable energy (excluding large hydro) accounted for 20% of the total installed power capacity (71.325 GW) as of 30 June 2018.

20. (b) Fuel cell vehicles use hydrogen gas to power an electric motor. Unlike conventional vehicles which run on gasoline or diesel, fuel cell cars and trucks combine hydrogen and oxygen to produce electricity, which runs a motor.

21. (d) Jammu & Kashmir receives the highest solar radiation in the country and The primary source of uranium in India is Jaduguda.

22. (d) Salt, or sodium chloride, is a non-renewable resource. A resource is defined as renewable only if it is self-replenishing. While new salt is being formed by natural processes in the earth, the timescale for that formation is too vast for salt to be considered self-replenishing in terms of human use.

23. (c) Some of the exhaustible resources are naturally regenerated after consumption and are known as renewable resources, e.g. forest trees and plants that make a forest may be destroyed but new ones grow in their place. But if forest is totally cut down to get land for construction of buildings, it is lost forever. Some other examples are fresh water, fertile soil, forest (yielding wood and other products), vegetation, wildlife, etc.

24. (b) Per capita use of water in European Union is the maximum.

25. (b) Both (A) and (R) are correct but (R) is not the correct explanation of (A)

26. (a) The percentage share of electrical power from solar energy in the total electric power generation from all renewable energy sources sought to be achieved by Indian government by the year 2022 is ~ 57.1%.

27. (c) Since CNG is based primarily on methane, it can be combusted without releasing too much carbon into the atmosphere. This makes CNG a much more environmentally friendly fuel alternative to petroleum and gasoline.

28. (a) TPP > RE > LHP > NE

Power generation as on 12-11-2018 as per Ministry of power, Government of India, is as under:

Total Thermal	2,21,768	64.1%
Hydro (Renewable)	45,487	13.1%
Nuclear	6,780	2.0%
RES* (MNRE)	72,013	20.8%

RES (Renewable Energy Sources) include Small Hydro Project, Biomass Gasifier, Biomass Power, Urban & Industrial Waste Power, Solar and Wind Energy.

29. (d) The term albedo refers to the amount of solar energy that gets reflected off of the Earth and lands back in space. To maintain a constant global average temperature, all of the sun's radiation that enters Earth's atmosphere must eventually be sent back to space. This is achieved through Earth's energy balance.

30. (a) **Potential energy** is mechanical or stored energy from an object that comes from factors such as its position relative to others, internal stress, electric charge or its condition rather than motion. This object has the capability of producing energy as these conditions change - this energy could be **kinetic energy, chemical energy, radiant energy, thermal energy or sound energy**. Some examples of the Potential Kinetic Energy are a coiled spring, Wheels on roller skates before someone skates, River water at the top of a waterfall, An airplane idling on the runway, a satellite before it is launched and placed into an orbit, Bullets before they are fired from a gun and Your radiant heating system in the summer.

31. (d) Power produced in 1 year

$= 360 \times 24 \times 60 \times 60$ Second = (Energy × efficiency) ÷ Time

$= (5\times10^{19} \times 0.04) \div 360 \times 24 \times 60 \times 60$

$= 64.3\times10^{19-10} = 63.41$ GW

32. (b) Air is used for conservation of energy in electricity generations.

33. (b) Solar cells are thin silicon disks that convert sunlight into electricity. The solar module consists of the silicon semiconductor surrounded by protective material in a metal frame. The protective material consists of an encapsulant of transparent silicon rubber or butyryl plastic (commonly used in automobile windshields) bonded around the cells, which are then embedded in ethylene vinyl acetate.

34. (c) The trophic state of a lake is determined by the amount of biologically useful nutrients dissolved in the waters of the lake. A water body can be oligotrophic, mesotrophic, eutrophic, and hypereutropic. Oligotrophic Lake is a lake with low productivity, low nutrients and clear water with drinking water quality. Algal blooms occur very rarely in oligotrophic lakes while it occurs very frequently in Eutrophic lakes.

35. (b) The tundra is the coldest of the biomes. The temperatures of the area are so cold that there is a layer of permanently frozen ground below the surface, called permafrost. This permafrost is a defining characteristic of the tundra biome.

36. (d) *Mangroves* are trees and shrub species that grow at the interface between land and sea in tropical and subtropical regions of the world, where the plants *exist* in conditions of salinity, tidal water flow and muddy soil.

37. (a) Radioactive wastes or nuclear wastes are stored so as to avoid any chance of radiation exposure to people, or any pollution. Disposal of low-level waste is straightforward and can be undertaken safely almost anywhere. Salt

is generally suitable for heat-generating HLW, and the OECD Nuclear Energy Agency has a 'Salt Club' researching this. Containment of the radio nuclides in the waste form mostly relies on the almost complete absence of water flow in the salt.

38. (c) India wants to increase its installed renewable energy capacity from 78 GW to 175 GW by March 2022. Of that 175 GW, 100 GW is supposed to be solar power. Moreover, India wants to nearly double the share of renewable power in its total installed capacity to 40% by 2030.

39. (c) Efficiency of electrical power generation is least from Geothermal sources.

40. (a) A nonrenewable resource is a resource of economic value that cannot be readily replaced by natural means on a level equal to its consumption. Examples of nonrenewable resources include crude oil, natural gas, coal, and uranium.

41. (b) Green building is the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's life-cycle. This practice expands and complements the classical building design concerns of economy, utility, durability, and comfort. Green buildings may incorporate sustainable materials in their construction; create healthy indoor environments with minimal pollutants; and/or feature landscaping that reduces water usage. Thus a green building uses minimum amount of energy, conserves natural resources, and creates space for healthy living.

42. (d) As on 31 December 2019, electricity produced in India by thermal powers is 230701.42 MW, Hydro power produced 45399.22 MW while and Nuclear Power produced 6780 MW. Thus the electricity produced by nuclear plant in India is least among all the sources.

43. (a) A fuel cell is a device in which electrochemical reaction takes place between Hydrogen and Oxygen. The main components of a fuel cell include an anode, a cathode, and an electrolyte. In presence of an electrolyte, the fuel ions i.e. Hydrogen ions react with the Oxygen ions to produce electricity, water vapour and heat.

44. (c) Oxygen-demanding wastes are the second category of water pollutants. These are the wastes that can be decomposed by oxygen-requiring bacteria. Oxygen Demanding Wastes Come from sewage, animal feedlots, food processing facilities, pulp mills, runoff from farmlands, and dumping of wastes into streams.

45. (a) A renewable resource is a resource which can be used repeatedly and replaced naturally. Examples of renewable resource include oxygen, fresh water, solar energy and biomass. Biomass is fuel that is developed from organic materials, a renewable and sustainable source of energy used to create electricity or other forms of power.

46. (a) The plants that are the source of biomass for energy capture almost the same amount of CO2 through photosynthesis while growing as is released when biomass is burned, which can make biomass a carbon-neutral energy source.

47. (d) The energy density of a fuel per unit mass is called the specific energy of that fuel. The coconut shell has a high calorific value of 20.8MJ/kg and can be used to produce steam, energy-rich gases, bio-oil, biochar etc. The "caloric content" dried wood is about 19 to 20 MJ/kg. While one dung cake of an average size gives 2100 kJ worth of energy.

48. (a) The Geological Survey of India has identified 350 geothermal energy locations in the country. The most promising of these is in Puga valley of Ladakh. The estimated potential for geothermal energy in India is about 10000 MW or 10 GW. Geothermal energy is heat derived within the sub-surface of the earth. Water and/or steam carry the geothermal energy to the Earth's surface. Depending on its characteristics, geothermal energy can be used for heating and cooling purposes or be harnessed to generate clean electricity.

49. (d) Causes of forest fires largely related to climatic conditions such as temperature, wind speed and direction, level of moisture in soil and atmosphere and duration of dry spells. Other natural causes are the friction of bamboos swaying due to high wind velocity and rolling stones that result in sparks setting off fires in highly inflammable leaf litter on the forest floor.

50. (c) Solid waste disposal management is usually referred to the process of collecting and treating solid wastes. It provides solutions for recycling items that do not belong to garbage or trash. The solid waste is treated through different methods such as Composting process, Solid Waste Open Burning, Sea dumping process, Solid wastes sanitary landfills, Incineration method, Disposal by Ploughing into the fields, Disposal by hog feeding, Salvaging procedure and Fermentation/biological digestion.
Composting is a biological process in which the organic portion of refuse is allowed to decompose under carefully controlled conditions. Microbes metabolize the organic waste material and reduce its volume by as much as 50 %. Composting offers a method of processing and recycling both garbage and sewage sludge in one operation.

51. (a) The Government of India has set an ambitious target of installing 175 GW of renewable energy capacity by the year 2022, which includes 100 GW from solar, 60 GW from wind, 10 GW from bio-power and 5 GW from small hydro-power.

52. (c) Soil particles are classified by size. The size of the soil particle gives texture to the soil and determines the amount of air and moisture that exists in the soil.
Clay particles measure less than 0.002 mm. Clay is the smallest type of soil particle.
Silt particles measure 0.06 mm to 0.002 mm. Silt's particles are larger than clay particles but smaller than sand particles. Sand particles measure 2.0 mm to 0.06 mm. Sand is the largest type of soil particle, and due to its size, allows quick drainage and plenty of airflow.

53. (b) Standing bodies of fresh water are often divided into categories that reflect levels of biological production. On the basis of biological production the water bodies are divided into Oligotrophic lakes, Eutrophic lakes and Mesotrophic lakes.
Oligotrophic lakes are those that are unproductive: net primary production is only between 50 and 100 milligrams of carbon per square metre per day, nutrients are in poor supply, and secondary production is depressed.

54. (c) Epistemology is the study of nature and extent of knowledge. The investigation into whether the social world can be studied using the methods of natural sciences pertains to study of knowledge.
Ontology is the philosophical study of being. Axiology is the branch of philosophy dealing with values, as those of ethics, aesthetics, or religion. Etymology is the study of the origins and historical development of words.

CHAPTER 42

Natural Hazard and Disasters

The term disaster owes its origin to the French word **"Desastre"** which is a combination of two words '*des*' meaning *bad* and '*aster*' meaning *star*. Thus the term refers to '*Bad or Evil star*'. A disaster can be defined as "*A serious disruption in the functioning of the community or a society causing wide spread material, economic, social or environmental losses which exceed the ability of the affected society to cope using its own resources*".

HAZARD

Hazard may be defined as "*a dangerous condition or event, that threat or have the potential for causing injury to life or damage to property or the environment*." The word '*hazard*' owes its origin to the word '*hasard*' in old French and '*az-zahr*' in *Arabic* meaning '*chance*' or '*luck*'. Hazards can be grouped into two broad categories namely natural and manmade.

Types	Types of Hazards
Geological Hazards	1. Earthquake 2. Tsunami 3. Volcanic Eruption 4. Landslides 5. Dam Burst 6. Mine Fire
Water & Climatic Hazards	1. Tropical Cyclone 2. Tornado and hurricane 3. Flood 4. Drought 5. Hailstorm 6. Cloud Burst 7. Landslide 8. Heat and Cold Wave 9. Snow Avalanche 10. Sea Erosion
Environmental Hazards	1. Environmental Pollution 2. Deforestation 3. Desertification 4. Pest Infection
Biological Hazards	1. Human/Animal Epidemics 2. Pest attacks 3. Food Poisoning 4. Weapons of mass destruction.
Chemical, Industrial and Nuclear Accidents	1. Chemical disasters 2. Nuclear disasters 3. Oil Spills/Fires 4. Nuclear
Accident Related	1. Transportation Urban fires bomb blast, Forest fires, Air Crash 2. Building collapse 3. Electrical accidents 4. Festival related disasters

DISASTER RISK MANAGEMENT

Disaster Risk Management includes sum total of all activities, programmes and measures which can be taken up before, during and after a disaster with the purpose to avoid a disaster, reduce its impact or recover from its losses. The three key stages of activities that are taken up within disaster risk management are:

1. **Before a Disaster (Pre-disaster).**
2. **During a Disaster (Disaster Occurrence).**
3. **After a Disaster (Post-disaster)**

Natural hazard management Earthquake : An **earthquake** (also known as a **quake**, **tremor** or **temblor**) is the shaking of the surface of the Earth, resulting from the sudden release of energy in the Earth's lithosphere that creates seismic waves.

TSUNAMI

The term Tsunami has been derived from a Japanese term '*Tsu*' meaning '*harbor*' and '*nami*' meaning '*waves*'. Tsunamis are popularly called tidal waves but they actually have nothing to do with the tides. These waves which often affect distant shores, originate by rapid displacement of water from the lake or the sea either by seismic activity, landslides, volcanic eruptions or large meteoroid impacts. Whatever the cause may be sea water is displaced with a violent motion and swells up, ultimately surging over land with great destructive power. The effects of a tsunami can be unnoticeable or even destructive.

CYCLONE

Cyclone is a region of low atmospheric pressure surrounded by high atmospheric pressure resulting in swirling atmospheric disturbance accompanied by powerful winds blowing in anticlockwise direction in the Northern Hemisphere and in the clockwise direction in the Southern Hemisphere. They occur mainly in the tropical and temperate regions of the world.

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CYCLONES ARE KNOWN BY DIFFERENT NAMES IN DIFFERENT PARTS OF THE WORLD:

- Typhoons: in the Northwest Pacific Ocean west of the dateline
- Hurricanes: in the North Atlantic Ocean, the Northeast Pacific Ocean east of the dateline, or the South Pacific Ocean.
- Tropical cyclones: the Southwest Pacific Ocean and Southeast Indian Ocean.
- Severe cyclonic storm" (the North Indian Ocean)
- Tropical cyclone (the Southwest Indian Ocean)
- Willie-Willie in Australia
- Tornado in South America

FLOOD

Flood is a state of high water level along a river channel or on the coast that leads to inundation of land, which is not usually submerged. Floods may happen gradually and also may take hours or even happen suddenly without any warning due to breach in the embankment, spill over, heavy rains etc.

DROUGHT

Drought is either absence or deficiency of rainfall from its normal pattern in a region for an extended period of time leading to general suffering in the society. It is interplay between demand that people place on natural supply of water and natural event that provides the water in a given geographical region.

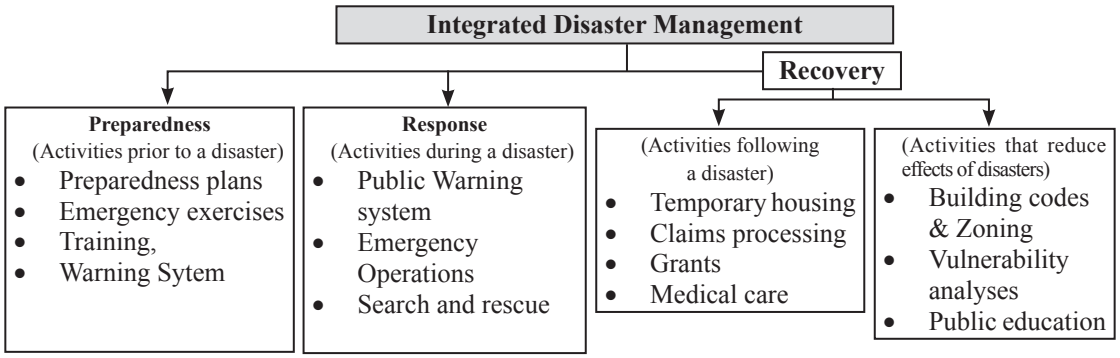
LANDSLIDES

The term '*landslide*' includes all varieties of mass movements of hill slopes and can be defined as the downward and outward movement of slope forming materials composed of rocks, soils, artificial fills or combination of all these materials along surfaces of separation by falling, sliding and flowing, either slowly or quickly from one place to another. Although the landslides are primarily associated with mountainous terrains, these can also occur in areas where an activity such as surface excavations for highways, buildings and open pit mines takes place.

Volcanic Eruptions: A **volcano** is a rupture in the crust of a planetary-mass object, such as Earth, that allows hot lava, volcanic ash, and gases to escape from a magma chamber below the surface.

Industrial Hazard

Industrial accidents resulting in releases of hazardous materials usually occur in a commercial context, such as mining accidents. They often have an environmental impact but also can be hazardous for people living in proximity. The *Bhopal disaster* saw the release of Dioxins into the neighbouring environment seriously affecting large numbers of people.



NATIONAL DISASTER MANAGEMENT AUTHORITY (NDMA)

The Government of India, in recognition of the importance of Disaster Management as a national priority, set up a High-Powered Committee (HPC) in August 1999 and a National Committee after the Gujarat earthquake, for making recommendations on the preparation of Disaster Management plans and suggesting effective mitigation mechanisms. The Tenth Five-Year Plan document also had, for the first time, a detailed chapter on Disaster Management. The Twelfth Finance Commission was also mandated to review the financial arrangements for Disaster Management.

The Disaster Management Act, 2005 provides for constitution of a number of institutions at national, state and district levels. At the national level, the Act establishes the National Disaster Management Authority headed by the Prime Minister. State Disaster Management Authorities (SDMAs) are headed by respective Chief Ministers, to spearhead and implement a holistic and integrated approach to Disaster Management in India.

National Disaster Management Authority is responsible for laying down policies and guidelines on disaster management. State Disaster Management Authorities also lays down policies and plans for disaster management in their respective states.

NATIONAL DISASTER RESPONSE FORCE (NDRF)

National Disaster Response Force (NDRF), a specialized multi skilled, humanitarian force of the country, working in the field of Diasater management.

The Disaster Management Act has statutory provisions for constitution of National Disaster Response Force (NDRF) for the purpose of specialized response to natural and man-made disasters. Accordingly, on January 19th, 2006 it came into existence and has been playing a vital role in Disaster Management and Community awareness for Disaster Risk Reduction (DRR) in the country.

EXERCISE

1. Water is always involved with landslides. This is because it: **[June-2006]**
(a) reduces the shear strength of rocks
(b) increases the weight of the overburden
(c) enhances chemical weathering
(d) is a universal solvent

2. The most significant impact of volcanic eruption has been felt in the form of: **[December-2006]**
(a) change in weather (b) sinking of islands
(c) loss of vegetation (d) extinction of animals

3. Which of the natural hazards have big effect on Indian people each year? **[June-2007]**
(a) Cyclones (b) Floods
(c) Earthquakes (d) Landslides

4. Tsunami occurs due to: **[June-2007]**
(a) Mild earthquakes and landslides in the oceans
(b) Strong earthquakes and landslides in the oceans
(c) Strong earthquakes and landslides in mountains
(d) Strong earthquakes and landslides in deserts

5. Which one of the following is appropriate for natural hazard mitigation? **[December-2007]**
(a) International AID (b) Timely Warning System
(c) Rehabilitation (d) Community Participation

6. Which one of the following natural hazards is responsible for causing highest human disaster? **[December-2007]**
(a) Earthquakes (b) Snow-storms
(c) Volcanic eruptions (d) Tsunami

7. Which one of the following is not associated with earthquakes? **[December-2008]**
(a) Focus (b) Epicenter
(c) Seismograph (d) Swells

8. Indian coastal areas experienced Tsunami disaster in the year: **[June-2009]**
(a) 2005 (b) 2004
(c) 2006 (d) 2007

9. Which of the following region is in the very high risk zone of earthquakes? **[June-2009]**
(a) Central Indian Highland (b) Coastal region
(c) Himalayan region (d) Indian desert

10. The most recurring natural hazard in India is **[December-2009]**
(a) Earthquakes (b) Floods
(c) Landslides (d) Volcanoes

11. Which type of natural hazards cause maximum damage to property and lives? **[June-2010]**
(a) Hydrological (b) Hydro-meteorological
(c) Geological (d) Geo-chemical

12. Volcanic eruptions affect **[December-2010]**
(a) atmosphere and hydrosphere
(b) hydrosphere and biosphere
(c) lithosphere, biosphere and atmosphere
(d) lithosphere, hydrosphere and atmosphere

13. Flash floods are caused when **[June-2011]**
(a) the atmosphere is convectively unstable and there is considerable vertical wind shear
(b) the atmosphere is stable
(c) the atmosphere is convectively unstable with no vertical windshear
(d) winds are catabatic

14. Which of the following is not a natural hazard? **[December-2011]**
(a) Earthquake (b) Tsunami
(c) Flash floods (d) Nuclear accident

15. S and P waves are associated with **[June-2012]**
(a) floods (b) wind energy
(c) earthquakes (d) tidal energy

16. In case of earthquakes, an increase of magnitude 1 on Richter Scale implies **[December-2012]**
(a) a ten-fold increase in the amplitude of seismic waves.
(b) a ten-fold increase in the energy of the seismic waves.
(c) two-fold increase in the amplitude of seismic waves.
(d) two-fold increase in the energy of seismic waves.

17. Which of the following types of natural hazards have the highest potential to cause damage to humans ? **[June-2013]**
(a) Earthquakes (b) Forest fires
(c) Volcanic eruptions (d) Droughts and Floods

18. Match List – I and List – II and select the correct answer from the codes given below: **[June-2014]**

List – I	List – II
A. Flood	**1.** Lack of rainfall of sufficient duration
B. Drought	**2.** Tremors produced by the passage of vibratory waves through the rocks of the earth
C. Earthquake	**3.** A vent through which molted substances come out
D. Volcano	**4.** Excess rain and uneven distribution of water

Codes:

	A	B	C	D
(a)	4	1	2	3
(b)	2	3	4	1
(c)	3	4	2	1
(d)	4	3	1	2

19. The National Disaster Management Authority functions under the Union Ministry of **[June-2014]**
(a) Environment (b) Water Resources
(c) Home Affairs (d) Defence

20. 'Lahar' is a natural disaster involving **[June-2014]**
(a) eruption of large amount of material
(b) strong winds
(c) strong water waves
(d) strong winds and water waves

21. The cyclone "Hudhud" hit the coast of which State? **[December-2014]**
(a) Andhra Pradesh (b) Karnataka
(c) Kerala (d) Gujarat

22. Two earthquakes A and B happen to be of magnitude 5 and 6 respectively on Richter Scale. The ratio of the energies released EB/EA will be approximately : **[June-2015]**
(a) ~ 8 (b) ~ 16 (c) ~ 32 (d) ~ 64

23. Which of the following phenomena is not a natural hazard? **[December-2015]**
(a) Wildfire (b) Lightning
(c) Landslide (d) Chemical contamination

24. World Meteorological Organisation's (WMO) objective has been to reduce the number of deaths due to hydrometeorological disasters over the decade 2010-2019 by (with reference to the decade 1994-2003) **[July-2016]**
(a) 25% (b) 50% (c) 75% (d) 80%

25. Which of the following is a meteorological hazard? **[August-2016]**
(a) Avalanche (b) Coastal erosion
(c) Landslide (d) Blizzard

26. Which of the following natural hazards is not hydrometeorological ? **[January-2017]**
(a) Snow avalanche (b) Sea erosion
(c) Tropical cyclone (d) Tsunami

27. Occurrence of natural hazards is affected by : **[November-2017]**
(A) Land use changes
(B) Drainage and construction
(C) Ozone depletion
(D) Climate change
Choose the correct answer from the code given below :
(a) (A), (C) and (D) (b) (A), (B) and (C)
(c) (A), (B) and (D) (d) (B), (C) and (D)

28. Which of the following types of natural disasters has no definite beginning and end **[July-2018]**
(a) Earthquakes (b) Landslides
(c) Hurricanes (d) Droughts

29. **Assertion (A) :** Indoor air pollution is a serious health hazard. **[July-2018]**
Reason (R) : The dispersal of air pollutants is rather limited in indoor environment. Choose the correct answer from the code given below:
(a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).
(c) (A) is true and (R) is false.
(d) Both (A) and (R) are false.

30. Which of the following disasters belongs to the category of nuclear disasters? **[20th June 2019-IInd Shift]**
(1) Fukushima disaster
(2) Chernobyl disaster
(3) Three mile Island incident
(4) The love canal disaster
Choose your answer from the options given below:
(a) (1), (2) and (3) (b) (1), (2) and (4)
(c) (1), (3) and (4) (d) (2), (3) and (4)

31. Which of the following belongs to the category of geophysical hazards? **[21st June 2019-Ist Shift]**
(a) Infestation (b) Avalanches
(c) Invasive species (d) Diseases

32. In the last few years, India has been affected by which of the following tropical cyclones? **[24th June 2019-Ist Shift]**
(a) Gaja, Hudhud, Bhima (b) Hudhud, Bhima, Ockhi
(c) Gaja, Hudhud, Ockhi (d) Gaja, Bhima, Ockhi

33. **Statement I:** Earthquake 'A' is 5 on Richter scale and Earthquake 'B' is 8 on the same scale. Earthquake 'B' has 1000 times the wave amplitude compared to 'A'. **[26th June 2019-Ist Shift]**
Statement II: The energy released in 'B' is three times that of 'A'.
Choose the correct option:
(a) Statement I is correct and Statement II is incorrect
(b) Statement I and II are correct
(c) Statement II is correct and I is incorrect
(d) Statement I and II are incorrect

34. Given below are two statements — one labelled as Assertion (A) and the other is labelled as Reason (R). **[3rd Dec. 2019-IInd Shift]**
Assertion **(A):** The impact of natural disasters does not depend on socio-economic factors.
Reason **(R):** Natural disasters do not discriminate between people of a society and other communities.
In the light of the above two statements. choose the correct option :
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true and (R) is not the correct explanation of (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

35. Match the following environmental disasters with the words or phrases associated them. **[5th Dec. 2019-IInd Shift]**

List I	List II
(A) Bhopal gas tragedy	(i) Dumping of Hazardous substances
(B) Chernobyl disaster	(ii) Peroxyaoetyl Nitrates (PAN)
(C) Love Canal tragedy	(iii) Nuclear Accident
(D) Los Angeles smog	(iv) Methyl Isocyanide

Choose the correct option from those given below :
(a) (A)-(ii), (B)-(iii), (C)-(iv), (D)-(i)
(b) (A)-(iv), (B)-(iiii), (C)-(i)- (D)-(ii)
(c) (A)-(ii), (B)-(i), (C)-(iv), (D)-(iii)
(d) (A)-(iv), (B)-(i), (C)-(iii), (D)-(ii)

36. Which among the following natural hazards has relatively slow onset? **[6th Dec. 2019-Ist Shift]**
(a) Volcanic eruptions (b) Droughts
(c) Wild free (d) Land and slides

37. Which of the following sequences of disposal options for low hazardous solid waste from industrial and urban sources is in order of increasing desirability? **[6th Dec. 2019-IInd Shift]**
(a) Indiscriminate dumping < Landfill < Incineration < Reuse
(b) Composting < Landfill < Reuse < Incineration
(c) Landfill < Composting < Reuse < Incineration
(d) Incineration < Composting < Reuse < Landfill

HINTS & EXPLANATION

1. (b) Landslides are mainly caused by gravity acting on weakened rocks and soil that make up a sloping area of land. Water from heavy rainfall is a frequent trigger for landslides.

2. (a) Volcanic eruptions can change or modify weather systems. They can cause rain, thunder and lightning. They can also have long-term effects on the climate, making their regions cooler.

3. (b) Floods have the biggest effect on Indian people each year.

4. (b) Tsunami are actually waves caused by sudden move ment of the ocean due to earthquakes, landslides on the sea floor, land slumping into the ocean, major volcanic eruptions or large meteorite impacts.

5. (b) Timely Warning System is appropriate for natural hazard mitigation.

6. (d) Tsunamis can cause great loss of life and property damage in coastal areas. Very large tsunamis can cause damage to coastal regions thousands of miles away from the earthquake that caused them.

7. (d) Swells, in the context of an ocean, are collections of waves produced by storm winds raging hundreds of miles out to sea, rather than the product of local winds along beaches. They are formed by a combination of factors and are coveted by surfers looking to catch a big wave.

8. (b) On December 26, 2004, an undersea earthquake with a magnitude of 9.1 struck off the coast of the Indonesian island of Sumatra. Over the next seven hours, a tsunami—a series of immense ocean waves—triggered by the quake reached out across the Indian Ocean.

9. (c) The very high risk zone of earthquakes in India is the zone 5, which is very severe intensity zone that is around Kashmir, Guwahati, the central and western of Himalayan region, northern and central Bihar and eastern India.

10. (b) The most recurring natural hazard in India is floods. Almost all of India is flood-prone, and extreme precipitation events, such as flash floods and torrential rains, have become increasingly common in central India over the past several decades.

11. (a) Hydrological natural hazards include flooding and related events (e.g., landslides and river scour and deposition) and droughts; coastal flooding and Tsunami. All these cause maximum damage to property and lives.

12. (c) Volcanic eruptions affect lithosphere, biosphere and atmosphere. Lithosphere means the rocks and soil on the crust of the Earth and the upper mantle. The hydrosphere is the water found on the surface of the Earth, in underground water sources, and in the atmospheric water vapor. The biosphere included all the living organisms on the planet.

13. (a) Vertical wind shear is defined as change of horizontal wind direction and/or speed with height, as would be determined by means of two or more anemometers mounted at different heights on a single mast. Flash flooding occurs when it rains rapidly on saturated soil or dry soil that has poor absorption ability.

14. (d) Natural hazards are naturally occurring physical phenomena caused either by rapid or slow onset events which can be geophysical (earthquakes, landslides, tsunamis and volcanic activity, avalanches and floods, extreme temperatures, drought and wildfires etc. Nuclear accidents are not a Natural hazards.

15. (c) S waves or secondary waves are the second waves to arrive during an earthquake. P waves or primary waves are the first waves to arrive at a seismograph.

16. (a) The Richter scale is a "logarithmic" scale, which means that each one-point increase on the scale represents a 10-fold increase in the magnitude of the quake.

17. (d) Droughts and Floods have the highest potential to cause damage to humans.

18. (a) The correct pairs are –
Flood – Excess rain and uneven distribution of water
Drought–Lack of rainfall of sufficient duration
Earthquake–Tremors produced by the passage of vibratory waves through the rocks of the earth
Volcano–A vent through which molted substances come out

19. (c) National Disaster Management Authority (NDMA) is an agency of the Ministry of Home Affairs whose primary purpose is to coordinate response to natural or man-made disasters and for capacity-building in disaster resiliency and crisis response.

20. (a) A Lahar is a type of natural disaster closely related to a volcanic eruption, and involves a large amount of material, including mud, rock, and ash sliding down the side of the volcano at a rapid pace.

21. (a) Hudhud caused extensive damage to the city of Visakhapatnam and the neighbouring districts of Vizianagaram and Srikakulam of Andhra Pradesh.

22. (c) The ratio of the energies released EB/EA will be approximately ~ 32.

23. (d) Chemical contaminants include plastics, resins, pharmaceuticals, disinfectants, deodorants, detergents, petroleum products, road runoff, pesticides and biocides, along with the results of land fill and incineration. They are not a natural hazard.

24. (b) World Meteorological Organisation's (WMO) objective was to reduce the number of deaths due to hydrometeorological disasters over the decade 2010-2019 by (with reference to the decade 1994-2003) is 50%.

25. (d) Meteorological hazards are caused by extreme weather, e.g. rain, drought, snow, extreme heat or cold, ice, or wind. Examples include blizzard, droughts, hailstorms, heat waves, hurricanes, floods (caused by rain), and tornadoes.

26. (d) Tsunami does not fall in the category of hydro-meteorological hazard.

27. (c) Occurrence of natural hazards is affected by land use changes, drainage and construction and climate change.

28. (d) Droughts
The onset of a drought can be gradual and subtle. It can take weeks, months, or even years for the full effects of long-term inadequate rainfall to become apparent.
The end of a drought can also be difficult to determine. While a single rainstorm will provide short-term relief from a drought, it might take weeks or months before levels of precipitation return to normal. The start and end of a drought are often only clear in hindsight.
Earthquakes start when tectonic plates shift and stop when they finally settle down. Foreshocks and aftershocks may sometimes be experienced, though.
A landslide, which is the movement of a mass of rock, debris, or earth down a slope due to gravity, can be triggered by rainfall, snowmelt, changes in water level, stream erosion, changes in ground water, earthquakes, volcanic activity, disturbance by human activities, or any combination of these factors. It ends when the unstable mass of earth comes to settle down at the end of the slope.
Hurricanes are large, swirling storms with winds of 119 kilometres per hour (74 mph) or higher. They start out as a tropical disturbance where rain clouds build over warm ocean waters; then, grow into a tropical depression and gather speed. They die out gradually after they drift from the warm water surface towards land.

29. (a) Both (A) and (R) are true and (R) is the correct explanation of (A)
Toxic products like paint, perfumes, sprays, preservatives; smoke from tobacco, incense sticks; biological pollutants like mites, hair from pets, pollen from plants; cause indoor pollution. Inadequate ventilation, high temperature and humidity hamper dispersal of pollutants.

30. (a) **Fukushima accident**, also called **Fukushima nuclear accident** was a nuclear accident took place in 2011 at the Fukushima Daiichi plant in northern **Japan**. It is the second worst nuclear accident in the history of **nuclear power** generation. The Chernobyl disaster was a also a nuclear accident that occurred on 26 April 1986 at Chernobyl Nuclear Power Plant, near the city of Pripyat in the north of the Ukrainian Soviet Socialist Republic. The Three Mile Island accident was a meltdown at a nuclear power plant near Middletown, Pennsylvania. It occurred on March 28, 1979. The Love Canal refers to one of the most tragic environmental manmade disasters in the world›s history. The catastrophe of Love Canal exemplifies the dangers of unrestricted dumping of chemicals.

31. (b) Geophysical hazards encompass geological and meteorological phenomena such as earthquakes, volcanic eruptions, wildfires, cyclonic storms, floods, droughts, avalanches and landslides. An avalanche is a geological phenomenon which occurs during winter. It is the movement of a large mass of ice or snow down a sloppy terrain.

32. (c) Cyclone Gaja crossed coast between Nagapattinam and Vedaranniyam with wind speed of 100-110 km/h gusting up to 120 km/h in November 2018. Cyclonic Hudhud was a strong tropical cyclone that caused extensive damage and loss of life in eastern India during October 2014. Cyclone Ockhi strucked the Indian coast in the end of November 2017.

33. (a) Because of the logarithmic basis of the scale, each whole number increase in magnitude represents a tenfold increase in measured amplitude. On the other way, one unit of magnitude is 10 times the amplitude on a seismogram, one unit of magnitude represents $10^{1.5}$ times (approximately 32 times) the energy, based on the long-standing empirical formula; log E∝1.5M where E is energy and M is magnitude. Hence in the given question, the energy released in 'B' is three times that of 'A' is a wrong statement.

34. (d) The impact of natural disasters is magnified among the lower socio-economic stratum as their means of protection, resistance, survival, and subsistence are low. It means the impact is very much dependent on socio-economic factors. So, Assertion (A) is false. However, natural disasters befall everyone in the affected area regardless of their allegiance to particular societies and communities. So, Reason (R) is correct.

35. (b) Bhopal Gas Tragedy occurred on the cold wintry night in the early hours of 3 December, 1984. It was estimated that 40 tonnes of Methyl Isocyanate (MIC) gas leakage took place with some other toxic chemicals from the Union Carbide Factory. Thousands of people lost their lives in this disaster. The *Chernobyl disaster* was a nuclear *accident* that occurred on Saturday 26 April 1986, at the No. 4 nuclear reactor in the *Chernobyl* Nuclear Power Plant, near the city of Pripyat in the north of the Ukrainian SSR.
One of the most famous and important examples of groundwater pollution in the U.S. is the **Love Canal tragedy** in Niagara Falls, New York. In the 1920s Niagara Falls began dumping urban waste into Love Canal, and in the 1940s the U.S. Army dumped waste from World War II there, including waste from the frantic effort to build a nuclear bomb.
Los Angeles Smog tragedy was a type of air pollution characterized by high levels of ozone and low visibility. It contains photochemical smog. Peroxyacyl nitrates or PANs are a component of photochemical smog.

36. (b) A slow-onset disaster is defined as one that does not emerge from a single, distinct event but one that emerges gradually over time, often based on a confluence of different events. Drought, insect infestations, and disease epidemic are some examples of slow onset. Droughts are relatively slow disasters. Climate change, environmental degradation and desertication are very slow onset events, but can and should be considered as disasters in terms of the damage and disruption to lives that they may or indeed already do create.

37. (a)

CHAPTER 43

Environmental Protection Laws of India

In the Constitution of India it is clearly stated that it is the duty of the state to 'protect and improve the environment and to safeguard the forests and wildlife of the country'. It imposes a duty on every citizen 'to protect and improve the natural environment including forests, lakes, rivers, and wildlife'. Reference to the environment has also been made in the Directive Principles of State Policy as well as the Fundamental Rights. The Department of Environment was established in India in 1980 to ensure a healthy environment for the country. This later became the Ministry of Environment and Forests in 1985.

The constitutional provisions are backed by a number of laws – acts, rules, and notifications. The EPA (Environment Protection Act), 1986 came into force soon after the Bhopal Gas Tragedy and is considered an umbrella legislation as it fills many gaps in the existing laws. Thereafter a large number of laws came into existence as the problems began arising, for example, Handling and Management of Hazardous Waste Rules in 1989.

GENERAL LAWS & ACTS

The Environment (Protection) Act (1986)

It authorizes the central government to protect and improve environmental quality, control and reduce pollution from all sources, and prohibit or restrict the setting and /or operation of any industrial facility on environmental grounds.

The Environment (Protection) Rules (1986)

These lay down procedures for setting standards of emission or discharge of environmental pollutants.

The objective of Hazardous Waste (Management and Handling) Rules (1989) is to control the generation, collection, treatment, import, storage, and handling of hazardous waste.

The Manufacture, Storage, and Import of Hazardous Rules (1989) define the terms used in this context, and sets up an authority to inspect, once a year, the industrial activity connected with hazardous chemicals and isolated storage facilities.

The Manufacture, Use, Import, Export, and Storage of hazardous Micro-organisms / Genetically Engineered Organisms or Cells Rules (1989) were introduced with a view to protect the environment, nature, and health, in connection with the application of gene technology and microorganisms.

The Public Liability Insurance Act and Rules and Amendment, (1992) was drawn up to provide for public liability insurance for the purpose of providing immediate relief to the persons affected by accident while handling any hazardous substance.

The National Environmental Tribunal Act (1995) has been created to award compensation for damages to persons, property, and the environment arising from any activity involving hazardous substances.

The National Environment Appellate Authority Act (1997) - has been created to hear appeals with respect to restrictions of areas in which classes of industries etc. are carried out or prescribed subject to certain safeguards under the EPA.

The Biomedical waste (Management and Handling) Rules (1998) is a legal binding on the health care institutions to streamline the process of proper handling of hospital waste such as segregation, disposal, collection, and treatment.

The Environment (Siting for Industrial Projects) Rules, (1999) lay down detailed provisions relating to areas to be avoided for siting of industries, precautionary measures to be taken for site selecting as also the aspects of environmental protection which should have been incorporated during the implementation of the industrial development projects.

The Municipal Solid Wastes (Management and Handling) Rules, (2000) apply to every municipal authority responsible for the collection, segregation, storage, transportation, processing, and disposal of municipal solid wastes.

The Ozone Depleting Substances (Regulation and Control) Rules (2000) have been laid down for the regulation of production and consumption of ozone depleting substances.

The Batteries (Management and Handling) Rules, (2001) - rules shall apply to every manufacturer, importer, re-conditioner, assembler, dealer, auctioneer, consumer, and bulk consumer involved in the manufacture, processing, sale, purchase, and use of batteries or components so as to regulate and ensure the environmentally safe disposal of used batteries.

The Noise Pollution (Regulation and Control) (Amendment) Rules (2002) lay down such terms and conditions as are necessary to reduce noise pollution, permit use of loud speakers or public address systems during night hours (between 10:00 p.m. to 12:00 midnight) on or during any cultural or religious festive occasion.

The Biological Diversity Act (2002) is an act to provide for the conservation of biological diversity, sustainable use of its components, and fair and equitable sharing of the benefits arising out of the use of biological resources and knowledge associated with it.

FOREST AND WILDLIFE

The Indian Forest Act and Amendment, (1984) is one of the many surviving colonial statutes. It was enacted to 'consolidate

the law related to forest, the transit of forest produce, and the duty leviable on timber and other forest produce'.

The Wildlife Protection Act, Rules 1973 and Amendment 1991 provides for the protection of birds and animals and for all matters that are connected to it whether it be their habitat or the waterhole or the forests that sustain them.

The Forest (Conservation) Act and Rules, (1981) provides for the protection of and the conservation of the forests.

WATER

The Easement Act (1882) allows private rights to use a resource that is, groundwater, by viewing it as an attachment to the land. It also states that all surface water belongs to the state and is a state property.

The Indian Fisheries Act (1897) establishes two sets of penal offences whereby the government can sue any person who uses dynamite or other explosive substance in any way (whether coastal or inland) with intent to catch or destroy any fish or poisonous fish in order to kill.

The River Boards Act (1956) enables the states to enroll the central government in setting up an Advisory River Board to resolve issues in inter-state cooperation.

The Merchant Shipping Act (1970) aims to deal with waste arising from ships along the coastal areas within a specified radius.

The Water (Prevention and Control of Pollution) Act (1974) establishes an institutional structure for preventing and abating water pollution. It establishes standards for water quality and effluent. Polluting industries must seek permission to discharge waste into effluent bodies. The CPCB (Central Pollution Control Board) was constituted under this act.

The Water (Prevention and Control of Pollution) Cess Act (1977) provides for the levy and collection of cess or fees on water consuming industries and local authorities.

The Water (Prevention and Control of Pollution) Cess Rules (1978) contains the standard definitions and indicate the kind of and location of meters that every consumer of water is required to affix.

The Coastal Regulation Zone Notification (1991) puts regulations on various activities, including construction, are regulated. It gives some protection to the backwaters and estuaries.

AIR

The Factories Act (1948) and Amendment in 1987 was the first to express concern for the working environment of the workers. The amendment of 1987 has sharpened its environmental focus and expanded its application to hazardous processes.

The Air (Prevention and Control of Pollution) (1981) Act provides for the control and abatement of air pollution. It entrusts the power of enforcing this act to the CPCB .

The Air (Prevention and Control of Pollution) Rules (1982) defines the procedures of the meetings of the Boards and the powers entrusted to them.

The Atomic Energy Act (1982) deals with the radioactive waste.

The Air (Prevention and Control of Pollution) Amendment Act (1987) empowers the central and state pollution control boards to meet with grave emergencies of air pollution.

The Motor Vehicles Act (1988) states that all hazardous waste is to be properly packaged, labelled, and transported.

International Conventions for Climate Change

Convention	Place	Crucial Documents
International Whaling Commission (1946)	Washington, D.C., United States.	• To keep under review and revise as necessary the measures laid down in the Schedule to the Convention which govern the conduct of whaling throughout the world.
Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973)	Washington, U.S.A.	• Help in conservation of species
Ramsar Convention on Wetland (1971)	Ramsar, Iran	• Halt the worldwide loss of wetlands and • To conserve, use and manage, those that remain. • This requires international cooperation, policy making, capacity building and technology transfer.
World Heritage Convention, 1972	Paris	• Recognizes the way in which people interact with nature, and the fundamental need to preserve the balance between the two. • Defines the kind of natural or cultural sites which can be considered for inscription on the World Heritage List under UNESCO.
Convention on the Conservation of Migratory Species of Wild Animals (1979)	Bad Godesberg, Germany	• It is an intergovernmental treaty • should promote, cooperate in and support research relating to migratory species • endeavour to provide immediate protection for migratory species • conservation and management of migratory species included in Appendix II

MARPOL Convention (73/78)	—	• To minimize pollution of the oceans and seas, including dumping, oil and air pollution.
Montreal Protocol on Substances that Deplete the Ozone Layer (1987)	Helsinki, Finland	• Play role in controlling the ozone depletion
Basel Convention on the Control of Trans boundary Movements of Hazardous Wastes and Their Disposal (1989)	Basel, Switzerland	• To reduce hazardous waste generation and promote environmental sound management system for their disposal. • Restrict trans boundary movement of such wastes and • Provide regulatory system applying to cases where such movement is allowable.
Convention on Biological Diversity (1993)		• The conservation of biological diversity • The sustainable use of the components of biological diversity • The fair and equitable sharing of the benefits arising out of the utilization of genetic resources
The United Nations Framework Convention on Climate Change (1994)	Kyoto, Japan	• Gather and share information on greenhouse gas emissions, national policies and best practices • Launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing c ountries • Cooperate in preparing for adaptation to the impacts of climate change
Global Tiger Forum (1994)	New Delhi, India	• Set up to embark on a worldwide campaign to save the wild tiger
United Nations Convention to Combat Desertification (1994)		• Promotes a global response to desertification, land degradation and drought
Kyoto Protocol (1997)	Kyoto, Japan	• Set targets on greenhouse-gas emissions for developed countries. • Fight global warming by reducing greenhouse gas concentrations in the atmosphere. • Reduce greenhouse gases by 18% below the emission levels of 1990.
United Nations Forum on Forests (2000)		• Implementation of agreements and foster a common understanding on sustainable forest management; • To provide policy development and dialogue among Governments and international organizations, • To enhance cooperation • To foster international cooperation and • To monitor, assess and report on progress of the above functions and objectives • To strengthen political commitment to the management, conservation and sustainable development.
Stockholm Convention on Persistent Organic Pollutants (2001)	Stockholm, Sweden	• It develops a risk management evaluation • Determines whether the substance fulfills POP screening. • Manage and dispose of POPs wastes in an environmentally sound manner
Rotterdam Convention (2004)	Rotterdam, Netherlands	• Convention promotes open exchange of information • Calls on exporters of hazardous chemicals to use proper labeling • Inform purchasers of any known restrictions or bans

INTERNATIONAL AGREEMENTS ON ENVIRONMENT

AGENDA-21

- It is a product of the Earth Summit (UN Conference on Environment and Development) held in Rio de Janeiro, Brazil, in 1992.
- The Agenda emphasizes on issues like poverty, health consumption patterns, natural resource use, financial resources and human settlements.

CARTAGENA PROTOCOL ON BIOSAFETY

- It is an international agreement which aims to ensure the safe handling, transport and use of living modified organisms (LMOs) resulting from modern biotechnology that may

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have adverse effects on biological diversity, taking also into account risks to human health.
- It was adopted on 29th January, 2000 and entered into force on 11 September 2003.

RIO EARTH SUMMIT

The Rio Earth Summit took place in June 1992 in Rio de Janeiro, Brazil. It was the largest environmental conference ever held attended by over 30,000 people including more than 100 heads of states. The objectives of the conference were to build upon the hopes and achievements of the Brundtland Report, in order to respond to pressing global environmental problems and to agree major treaties on biodiversity, climate change and forest management.

The biggest challenges faced at the Rio Earth Summit involved finance, consumption rates and population growth. The developed nations demanded environmental sustainability while the developing nations argued that they should be given the chance to catch up socially and economically with the developed world.

Five separate agreements were made at the Rio Earth Summit.
- The Convention on Biological Diversity;
- The Framework Convention on Climate change;
- Principles of Forest Management;
- The Rio Declaration on Environment and Development; and
- Agenda 21.

MONTREAL PROTOCOL

The Montreal Protocol is an international environmental agreement with universal ratification to protect the earth's ozone layer by eliminating use of ozone depleting substances (ODS), which would otherwise allow increased UV radiation to reach the earth, resulting in higher incidence of skin cancers and eye cataracts, more-compromised immune systems, and negative effects on watersheds, agricultural lands and forests.

INTERNATIONAL SOLAR ALLIANCE

International Solar Alliance (ISA) is an alliance of 121 solar resource rich countries lying fully or partially between the Tropics of Cancer and Capricorn. ISA was jointly launched by India and France on November 30, 2015 in Paris, on the side-lines of the 21st Conference of Parties (CoP 21) to the United Nations Framework Convention on Climate Change (UNFCCC). The ISA Framework Agreement was opened for signature on 15 November 2016 in Marrakech, Morocco, on the side-lines of CoP-22.

Important Dates Related to Environment

Name	Date
World Wetland Day	2nd February
World Forest Day	21st March
World Water Day	22nd March
World Meteorological Day	23rd March
World Heritage Day	18th April
Earth Day	22nd April
Bio- Diversity Day	22nd May
World Environment Day	5th June
World Nature Conservation Day	28th July
International Tiger Day	29th July
International Day for Disaster Reduction	13th October
International Day of Climate Action	24th October
World Fisheries Day	21st November
World Soil Day	5th December
International Day to Combat Desertification and Drought	17th June
World Tiger Day	29th July
World Elephant Day	12th August

EXERCISE

1. Which of the following is not covered in 8 missions under the Climate Action Plan of Government of India ? **[December-2010]**

(a) Solar power
(b) Waste to energy conversion
(c) Afforestation
(d) Nuclear energy

2. The Ganga Action Plan was initiated during the year **[June-2011]**

(a) 1986 (b) 1988
(c) 1990 (d) 1992

3. Nagoya Protocol is related to **[December-2012]**

(a) Climate change (b) Ozone depletion
(c) Hazardous waste (d) Biodiversity

4. Which of the following is a source of emissions leading to the eventual formation of surface ozone as a pollutant ? **[June-2013]**

(a) Transport sector
(b) Refrigeration and Airconditioning
(c) Wetlands
(d) Fertilizers

5. Kyoto Protocol is related to **[June-2013]**
(a) Ozone depletion (b) Hazardous waste
(c) Climate change (d) Nuclear energy

6. By the year 2022, the Climate Change Action Plan of Government of India aims at installing **[September-2013]**
(a) 20,000 MW of wind power
(b) 25,000 MW of wind power
(c) 20,000 MW of solar power
(d) 10,000 MW of solar power

7. In order to avoid catastrophic consequences of climate change, there is general agreement among the countries of the world to limit the rise in average surface temperature of earth compared to that of pre-industrial times by **[June-2014]**
(a) 1.5 °C to 2 °C (b) 2.0 °C to 3.5 °C
(c) 0.5 °C to 1.0 °C (d) 0.25 °C to 0.5 °C

8. Match List – I and List – II and identify the correct **code :** **[December-2014]**

A.	World Health Day	i.	16th September
B.	World Population Day	ii.	1st December
C.	World Ozone Day	iii.	11th July
D.	World AIDS Day	iv.	7th April

Codes :

	A	B	C	D
(a)	i	ii	iii	iv
(b)	iv	iii	i	ii
(c)	ii	iii	iv	i
(d)	iii	iv	ii	i

9. In which country, the recent international agreement on phasing out Hydro Fluoro Carbons (HFCs) was signed ? **[January-2017]**
(a) Rwanda (b) Morocco
(c) South Africa (d) Algeria

10. International Drinking Water Supply and Sanitation Decade (IDWSSD) was observed **[December-2018]**
(a) 1981-1990 (b) 1991-2000
(c) 1971-1980 (d) 1965-1975

11. One of the main outcomes of the Rio +20 conference was to develop a set of: **[20th June 2019-Ist Shift]**
(a) Sustainable Development Goals
(b) Millennium Development Goals
(c) National Development Strategy
(d) National Land Restoration Strategy

12. The Paris Agreement aims to limit the temperature rise in this century by how many degrees Celsius above the preindustrial levels? **[20th June 2019-IInd Shift]**
(a) 1° C (b) 2° C
(c) 0.5° C (d) 3° C

13. Which of the following is/are missions under the national action plan on climate change? **[25th June 2019-Ist Shift]**
(1) Sustaining the Himalayan ecosystem
(2) Sustainable forest management
(3) Strategic knowledge for climate change
Select the correct answer:
(a) (1) and (2) only (b) (2) only
(c) (2) and (3) only (d) (1) and (3) only

14. The initiative to establish International Solar Alliance was jointly taken by **[25th June 2019-Ist Shift]**
(a) USA and India (b) France and India
(c) Sweden and India (d) China and India

15. Which of the following are features of Paris Agreement? **[25th June 2019-IInd Shift]**
(1) The agreement focuses on mitigation measures for environmental pollution
(2) The agreement recognizes the principles of equity and common but differentiated responsibilities
(3) paris agreement pertains to 2020 climate actions
Select the correct answer:
(a) (1) and (2) only (b) (1), (2) and (3)
(c) (2) and (3) only (d) (1) and (3) only

16. Montreal protocol aims at: **[26th June 2019-Ist Shift]**
(a) Reduction in emissions of greenhouse gases.
(b) Phasing out ozone depleting substances.
(c) Prohibiting transboundary movement of hazardous waste.
(d) Enhancing cooperation among UN member states for peaceful uses of nuclear energy.

17. The Government of India has set up the Ministry of Jal Shakti by merging/renaming which of the following: **[2nd Dec. 2019-Ist Shift]**
(a) Ministry of Water Resources and Ministry of Earth Sciences
(b) Ministry of Water Resources: Ministry of River Development and Ganga Rejuvenation: and Ministry of Rural Development
(c) Ministry of Water Resources: Ministry of River Development and Gangs Rejuvenation: and Ministry of Drinking Water and Sanitation
(d) Ministry of Water Resources

18. Which of the following UN Conferences/Summit adopted the programme of Action for Sustainable Development? **[2nd Dec. 2019-Ist Shift]**
(a) Stockholm Conference
(b) Rio de Janeiro Conference
(c) Johannesburg Summit
(d) Ahmadabad Conference

19. Which of the following indicates the objective of the United Nations Framework Convention on Climate Change (UNFCCC)? **[2nd Dec. 2019-Ist Shift]**
(a) To stabilize greenhouse gases concentration in the atmosphere
(b) To prescribe limits on greenhouse gas emissions for individual countries
(c) To lay down enforcement mechanisms
(d) To prepare lines for formulation of Climate Action Plan by member countries

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20. For encouraging worldwide awareness and action for the protection of our environment, UNEP focused on the World Environment Day (2019) on which of the following themes'? **[2nd Dec. 2019-Ist Shift]**
(a) Conserve energy
(b) Tackle climate change
(c) Beat air pollution
(d) Save Water

21. The Montreal Protocol refers to **[2nd Dec. 2019-IInd Shift]**
(a) Cooperation among UN member countries to combat climate change
(b) Phasing out the consumption and production of ozone depleting substances
(c) Ensuring environmental sustainability
(d) Safeguarding societal quality of life worldwide

22. In which category Cochin International Airport has been conferred the UN's Champion of the Earth Award? **[2nd Dec. 2019-IInd Shift]**
(a) Policy Leadership (b) Entrepreneurial Vision
(c) Science and Innovation (d) Inspiration and Action

23. National Disaster Management Authority is an agency of the Ministry of **[3rd Dec. 2019-Ist Shift]**
(a) Jal Shakti (b) Home Affairs
(c) Earth Science (d) Housing and Urban Affairs

24. Under Kyoto Protocol. the first committment period for reduction of greenhouse gas emissions by 37 industrialized and European community countries was : **[3rd Dec. 2019-IInd Shift]**
(a) 1997 — 2005 (b) 2000 — 2012
(c) 2008 — 2012 (d) 2005 — 2015

25. Under Green India Mission, how many hectares of degraded forest land is to be brought under afforestation? **[4th Dec. 2019-Ist Shift]**
(a) 02 million hectares
(b) 06 million hectares
(c) 08 million hectares
(d) 20 million hectares

26. Identify from the options given below, the co-benefit of Montreal Protocol **[4th Dec. 2019-Ist Shift]**
(a) Impetus to development of energy efficient systems
(b) Reduction in carbon dioxide (equivalent) emissions
(c) Convergence of efforts of international community in addressing air pollution
(d) Control of transboundary movement of hazardous waste

27. Montreal protocol was signed in order to address which of the following environmental issues? **[5th Dec. 2019-IInd Shift]**
(a) Tropospheric ozone pollution
(b) Depletion of ozone in the stratosphere
(c) Global warming
(d) Acid rain

28. Under Kyoto protocol, the parties, in the second commitment period, have to reduce their greenhouse gas emissions with reference to 1990 levels by atleast **[6th Dec. 2019-Ist Shift]**
(a) 10% (b) 12%
(c) 15% (d) 18%

29. As per provisions of Paris Agreement, the Intended Nationally Determined Contributions (INDCs) are to be reviewed every **[6th Dec. 2019-IInd Shift]**
(a) 15 years (b) 10 years
(c) 5 years (d) 3 years

HINTS & EXPLANATION

1. (d) The eight national missions by India include Solar Energy, Enhanced Energy Efficiency, Sustainable Habitat, Water, Sustaining the Himalayan Ecosystem, Green India, Sustainable Agriculture and Strategic knowledge for Climate Change.

2. (a) The Ganga action plan was launched by Shri Rajeev Gandhi, the then Prime Minister of India on 14 Jan. 1986 with the main objective of pollution abatement, to improve the water quality by Interception, Diversion and treatment of domestic sewage and present toxic and industrial chemical wastes from identified grossly polluting units entering into the river.

3. (d) The Nagoya Protocol on access to genetic resources and the fair and equitable sharing of benefits arising from their utilization (ABS) to the convention on biological diversity is a supplementary agreement to the convention on biological diversity.

4. (a) Transport sector is a source of emissions leading to the eventual formation of surface ozone as a pollutant.

5. (c) The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change, which commits its Parties by setting internationally binding emission reduction targets.

6. (c) By the year 2022, the Climate Change Action Plan of Government of India aims at installing 20,000 MW of solar power. The ambitious target for 2022 of 20,000 MW or more, will be dependent on the 'learning' of the first two phases, which if successful, could lead to conditions of grid-competitive solar power.

7. (a) In order to avoid catastrophic consequences of climate change, there is general agreement among the countries of the world to limit the rise in average surface temperature of earth compared to that of pre-industrial times by 1.5 °C to 2 °C.

8. **(b)** World Health Day – 7th April
World Population Day – 11th July
World Ozone Day – 16th September
World AIDS Day – 1st December

9. (a) At a meeting in 2016 in Rwanda, world leaders have agreed controls on hydrofluorocarbon (HFC) consumption and production that could potentially help avoid over 0.4˚C of global warming.

10. (a) The International Drinking Water Supply and Sanitation Decade (IDWSSD), now known as The First Water Decade was the ten-year period 1981 - 1990 designated by the United Nations to bring attention and support for clean water and sanitation worldwide.

11. (a) The United Nations Conference on Sustainable Development - or Rio + 20 - took place in Rio de Janeiro, Brazil on 20-22 June 2012. It resulted in a focused political outcome document which contains clear and practical measures for implementing sustainable development. In Rio, Member States decided to launch a process to develop a set of Sustainable Development Goals (SDGs), which will build upon the Millennium Development Goals and converge with the post 2015 development agenda.

12. (b) The Paris Agreement builds upon the Convention and for the first time brings all nations into a common cause to undertake ambitious efforts to combat climate change and adapt to its effects, with enhanced support to assist developing countries to do so. Its central *aim* is to strengthen the global response to the threat of *climate* change by keeping a global *temperature rise* this *century* well below 2 *degrees Celsius above pre-industrial levels* and to pursue efforts to *limit the temperature* increase even further to 1.5 *degrees Celsius*.

13. (d) National Action Plan on Climate Change (NAPCC) was released on 30th June 2008 to address the future policies and programs for the climate mitigation and adaptation. The NAPCC identifies measures that promote development objectives while also yielding co-benefits for addressing climate change effectively. There are eight "National Missions" which form the core of the National action plan. They focus on promoting understanding of climate change, adaptation and mitigation, energy efficiency and natural resource conservation."The eight missions are described in the figure given below:

National Solar Mission
National Mission on Sustainable Agrculture
National Mission on Enhanced
National Mission on Strategic Knowledge for Climate Change
NAPCC
National Mission on Sustainable Habiat
National Mission for Sustaining the Himalayan Ecosystem
National Water Mission
National Mission for a 'Green India'

14. (b) The International Solar Alliance (ISA), which was jointly launched by Prime Minister Narendra Modi and France's then President Francois Hollande in November 2015 on the sidelines of COP21. It is an international treaty-based alliance of 121 solar-rich countries situated fully or partially between the Tropics of Cancer and Capricorn. ISA's goal is to produce 1 trillion watt (1000 GW) of solar energy by 2030. ISA headquarter is located in Gurgaon (Haryana).

15. (c) The Paris Agreement is a landmark environmental accord that was adopted by nearly every nation in 2015 to address climate change and its negative impacts. The deal aims to substantially reduce global greenhouse gas emissions in an effort to limit the global temperature increase in this century to 2 degrees Celsius above preindustrial levels, while pursuing means to limit the increase to 1.5 degrees. The agreement includes commitments from all major emitting countries to cut their climate-altering pollution and to strengthen those commitments over time.

16. (b) **Montreal Protocol,** formally **Montreal Protocol on Substances That Deplete the Ozone Layer,** international treaty, adopted in Montreal on Sept. 16, 1987, that aimed to regulate the production and use of chemicals that contribute to the depletion of Earth's ozone layer.

17. (c) Ministry of Jal Shakti was formed by the Government of India in May 2019. This was formed by merging of two ministries; Ministry of Water Resources, River Development & Ganga Rejuvenation and Ministry of Drinking Water and Sanitation.

18. (b) At Earth Summit that was held in Rio de Janeiro during 3-14 June 1992, the international community adopted Agenda 21, an unprecedented global plan of action for sustainable development. This conference later came to be called the Rio Conference. In this conference three major agreements were adopted that were Rio Declaration on Environment and Development, a series of principles defining the rights and responsibilities of States, Agenda 21, a global plan of action to promote sustainable development and Statement of Forest Principles, a set of principles to underpin the sustainable management of forests worldwide.

19. (a) The United Nations Framework Convention on Climate Change (UNFCCC) entered into force on 21 March 1994. The 197 countries that have ratified the Convention are called Parties to the Convention. The objective of the Convention is to stabilize greenhouse gas concentrations "at a level that would prevent dangerous anthropogenic interference with the climate system." It states that "such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner."

20. (c) Since 1974 World Environment Day is celebrated every year on 5th June to spread awareness, to encourage people to take action and to protect the environment.

The theme of World Environment day this is Air Pollution. World Environment Day is promoted by the United Nation and for **2019 China being the host country**. World Environment Day is also known as the **Environment Day and Eco Day**.

21. (b) The Montreal Protocol was signed in 1987 and entered into force in 1989. The Montreal Protocol on Substances that Deplete the Ozone Layer is a global agreement to protect the Earth's ozone layer by phasing out the chemicals that deplete it. This phase-out plan includes both the production and consumption of ozone-depleting substances.

22. (b) Cochin International Airport has been honoured by with the award '**Champions of the Earth**' on 26th September 2018. The award has been given by UN in the category of Entrepreneurial Vision, for its **leadership in the use of sustainable energy.** A champion of the Earth is the UN's highest environmental honour. It was launched 2005.

23. (b) The Disaster Management (DM) Division is the nodal division in Ministry of Home Affairs (MHA) for disaster management. On 23 December 2005, the Government of India enacted the Disaster Management Act, which envisaged the creation of National Disaster Management Authority (NDMA), headed by the Prime Minister, and State Disaster Management Authorities (SDMAs) headed by respective Chief Ministers, to spearhead and implement a holistic and integrated approach to Disaster Management in India.

24. (c) The Kyoto Protocol was adopted on Dec. 11, 1997, and entered into force on Feb. 16, 2005. It is the only agreement to have emerged from the UNFCCC process that imposed binding limits on the emission of GHGs. Under the Protocol, 37 industrialized countries and the countries in the European Community committed themselves to binding targets for GHG emissions for the first compliance period from 2008 to 2012.

25. (b) Green India Mission (GIM), is one of the eight Missions outlined under the National Action Plan on Climate Change. It was launched in February 2014. GIM aims at enhancing ecosystem services such as carbon sink. It builds on the Prime Minister's Green India campaign for afforestation of 6 million hectares and the national target of increasing land area under forest cover from 23% to 33%.

26. (b) The objective of the Montreal Protocol is to protect human health and the environment by phasing out nearly 100 industrial chemicals known as ozone depleting substances (ODS). Other Montreal Protocol's objectives to eliminating HCFCs while at the same time achieving energy efficiency gains and CO2 emissions reduction are climate co-benefit.

27. (b) The Montreal Protocol on Substances that Deplete the Ozone Layer (the Montreal Protocol) is an international agreement made in 1987. It was designed to stop the production and import of ozone depleting substances and reduce their concentration in the atmosphere to help protect the earth's ozone layer. Ozone mostly about 90% found in a layer that begins between 10 and 17 kilometres above the Earth's surface and extends up to about 50 kilometres. This region of the atmosphere is called the stratosphere.

28. (d) The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change, which commits its Parties by setting internationally binding emission reduction targets. During the second commitment period, Parties committed to reduce Green house gas emissions by at least 18 % below 1990 levels in the eight-year period from 2013 to 2020; however, the composition of Parties in the second commitment period is different from the first.

29. (c) Countries across the globe adopted an historic international climate agreement at the U.N. Framework Convention on Climate Change (UNFCCC) Conference of the Parties (COP21) in Paris in December 2015. In anticipation of this moment, countries publicly outlined what post-2020 climate actions they intended to take under the new international agreement, known as their Intended Nationally Determined Contributions (INDCs).

Under the provisions of the Paris Agreement, countries will be expected to submit an updated NDC every five years, which will represent a progression beyond the country's then current NDC to reflect its highest possible ambition.

CHAPTER 44

Institutions of Higher Learning and Education in Ancient India

India has a rich tradition of learning and education right from the ancient. In the course of time, a group of intellectuals, the Brahmans, became priests and men of learning. Earlier religion was the mainspring of all activities in ancient India. Religion saturated educational ideals too, and the study of Vedic literature was indispensable to higher castes. Two methods of teaching were being practiced. The first method was Oral and the second was based on Chintan i.e. thinking.

With the spread of Buddhism and Jainism, the education in ancient India moved to another level. Buddhists monasteries became the centre for education. During this period education became accessible to all class and castes and classes and the education not only focused on learning Vedas but also focused more on over all development of the child.

The period of Guptas, Harshas and their successors, is a remarkable period for education in Indian history. It was the age of the universities of Nalanda and Valabhi and of the rise of Indian sciences, mathematics, and astronomy. The British established formal system of higher education which continues till date. English Higher Education in India really began with the establishment of a Hindu College in Calcutta in 1817. Hindu College at Calcutta was the first Europeanised institution of higher learning in the country. The idea of establishing universities in India on the model of the London University was first promoted in Sir Charles Wood's Dispatch of 1854 which has been described as the Magna Carta of English education in India.

EXERCISE

1. Which of the following agencies as concerned with education and culture? **[June-2005]**
(a) UNESCO (b) UNICEF
(c) IMO (d) IEO

2. The headquarters of the international court of justice is located at **[June-2005]**
(a) New York (b) Hague
(c) Paris (d) London

3. CSIR is related with **[June-2005]**
(a) Agricultural research
(b) Industrial research
(c) Defence research organisation
(d) Road research

4. Match List - I with List-II and select the correct answer from the code given below : **[December-2005]**

List-I (Institutions)	List-II (Locations)
A. The Indian Council of Historical Reasearch (ICHR)	(i) Shimla
B. The Indian Institute of Advanced Studies (IIAS)	(ii) New Delhi
C. The Indian Council of Philosophical Research (ICPR)	(iii) Banglore
D. The Central Institute of Coastal Engineering for fisheries	(iv) Lucknow

Codes :

	A	B	C	D
(a)	ii	i	iv	iii
(b)	i	ii	iii	iv
(c)	ii	iv	i	iii
(d)	iv	iii	ii	i

5. The first Indian chronicler of Indian history was: **[June-2006]**
(a) Megasthanese (b) Fahiyan
(c) Huan Tsang (d) Kalhan

6. Which of the following institutions in the field of education is set up by the MHRD Government of India? **[June-2006]**
(a) Indian council of world Affair, New Delhi
(b) Mythic Society, Bangalore
(c) National Bal Bhavan, New Delhi
(d) India International Centre, New Delhi

7. The University Grants Commission was constituted on the recommendation of: **[December-2006]**
(a) Dr. Sarvapalli Radhakrishnan Commission
(b) Mudaliar Commission
(c) Sargent Commission
(d) Kothari Commission

8. Universities having central campus for imparting education are called: **[June-2007]**
(a) Central Universities (b) Deemed Universities
(c) Residential Universities (d) Open Universities

9. Match List - I with List - II and select the correct answer using the codes given below: **[December-2007]**

List-I (Institutes)	List-II (Locations)
A. Central Institute of English	(i) Chitrakoot and Foreign Languages
B. Gramodaya Vishwavidyalaya	(ii) Hyderabad
C. Central Institute of Higher Tibetan Studies	(iii) New Delhi
D. IGNOU	(iv) Dharmasala

Codes :

	A	B	C	D
(a)	(ii)	(i)	(iv)	(iii)
(b)	(iv)	(iii)	(ii)	(i)
(c)	(iii)	(iv)	(i)	(ii)
(d)	(i)	(ii)	(iv)	(iii)

10. The head quarter of Mahatma Gandhi Antarrashtriya Hindi Vishwavidyalaya is situated in: **[December-2007]**

(a) Sevagram (b) New Delhi
(c) Wardha (d) Ahmedabad

11. The Government established the University Grants Commission by an Act of Parliament in the year: **[June-2007]**

(a) 1980 (b) 1948
(c) 1950 (d) 1956

12. Match List-I with List-II and select the correct answer from the code given below: **[June-2008]**

List-I (Institutions)	List-II (Locations)
A Dr. Hari Singh	(i) Mumbai Gour University
B S.N.D.T. University	(ii) Baroda
C M.S. University	(iii) Jodhpur
D J.N. Vyas University	(iv) Sagar

Codes:

	A	B	C	D
(a)	(iv)	(i)	(ii)	(iii)
(b)	(i)	(ii)	(vi)	(iv)
(c)	(iii)	(i)	(ii)	(iv)
(d)	(ii)	(iv)	(i)	(iii)

13. Which one of the following is not situated in New Delhi? **[June-2008]**

(a) Indian Council of Cultural Relations
(b) Indian Council of Scientific Research
(c) National Council of Educational Research and Training
(d) Indian Institute of Advanced Studies

14. National Council for Women's Education was established in: **[June-2008]**

(a) 1958 (b) 1976
(c) 1989 (d) 2000

15. The National Museum at New Delhi is attached to: **[December-2008]**

(a) Delhi University
(b) a Deemed University
(c) a Subordinate Office of the JNU
(d) Part of Ministry of Tourism and Culture

16. According to Radhakrishnan Commission, the aim of Higher Education is: **[December-2008]**

(a) To develop the democratic values, peace and harmony
(b) To develop great personalities who can give their contributions in politics, administration, industry and commerce
(c) Both (A) and (B)
(d) None of these

17. Match List-I with List-II and select the correct answer using the codes given below: **[June-2009]**

List – I (Institutes)	List – II (Cities)
A. Central Arid Zone Institute	(i) Kolkata
B. Space Application Centre	(ii) New Delhi
C. Indian Institute of Public Administration	(iii) Ahmedabad
D. Headquarters of Indian Science Congress	(iv) Jodhpur

Codes :

	A	B	C	D
(a)	(iv)	(iii)	(ii)	(i)
(b)	(iv)	(ii)	(i)	(iii)
(c)	(iii)	(i)	(ii)	(iv)
(d)	(i)	(ii)	(iv)	(iii)

18. Which of the following is not a Dualmode University? **[June-2009]**

(a) Delhi University
(b) Bangalore University
(c) Madras University
(d) Indira Gandhi National Open University

19. The Kothari Commission's report was entitled on : **[June-2009]**

(a) Education and National Development
(b) Learning to be adventure
(c) Diversification of Education
(d) Education and socialization in democracy

20. The University which telecasts interactive educational programmes through its own channel is **[December-2009]**

(a) Osmania University
(b) University of Pune
(c) Annamalai University
(d) Indira Gandhi National Open University (IGNOU)

21. The accreditation process by National Assessment and Accreditation Council (NAAC) differs from that of National Board of Accreditation (NBA) in terms of **[June-2010]**

(a) Disciplines covered by both being the same, there is duplication of efforts.
(b) One has institutional grading approach and the other has programme grading approach.
(c) Once get accredited by NBA or NAAC, the institution is free from renewal of grading, which is not a progressive decision.
(d) This accreditation amounts to approval of minimum standards in the quality of education in the institution concerned.

22. India's first Defence University is in the State of **[December-2010]**

(a) Haryana (b) Andhra Pradesh
(c) Uttar Pradesh (d) Punjab

23. The first Open University in India was set up in the State of **[June-2011]**

(a) Andhra Pradesh (b) Delhi
(c) Himachal Pradesh (d) Tamil Nadu

24. Indicate the number of Regional Offices of University Grants Commission of India. **[December-2011]**

(a) 10 (b) 07
(c) 08 (d) 09

25. India has the highest number of students in colleges after **[December-2012]**

(a) the U.K. (b) the U.S.A.
(c) Australia (d) Canada

26. In which of the following categories the enrolment of students in higher education in 2010-11 was beyond the percentage of seats reserved ? **[June-2013]**

(a) OBC students (b) SC students
(c) ST students (d) Woman students

27. Which of the following is/are a minority institution(s) ? **[September-2013]**

1. Punjabi University, Patiala
2. Osmania University, Hyderabad
3. Kashmir University, Srinagar
4. St. Stephens College, Delhi

Select the correct answer from the code given below :

Codes :

(a) 1 and 2 (b) 2 and 4
(c) 2 only (d) 4 only

28. The Verstehen School of Understanding was popularised by **[December-2013]**

(a) German Social Scientists
(b) American Philosophers
(c) British Academicians
(d) Italian Political Analysts

29. The first virtual university of India came up in **[December-2013]**

(a) Andhra Pradesh (b) Maharashtra
(c) Uttar Pradesh (d) Tamil Nadu

30. Which of the following universities has adopted the meta university concept? **[June-2014]**

(a) Assam University (b) Delhi University
(c) Hyderabad University (d) Pondicherry University

31. Which of the following are Central Universities? **[June-2014]**

1. Pondicherry University
2. Vishwa Bharati
3. H.N.B. Garhwal University
4. Kurukshetra University

Select the correct answer from the code given below :

Codes :

(a) 1, 2 and 3 (b) 1, 3 and 4
(c) 2, 3 and 4 (d) 1, 2 and 4

32. The maximum number of fake institutions / universities as identified by the UGC in the year 2014 are in the State / Union territory of **[December-2014]**

(a) Bihar (b) Uttar Pradesh
(c) Tamil Nadu (d) Delhi

33. The total number of central universities in India in April 2015 was : **[June-2015]**

(a) 08 (b) 14
(c) 27 (d) 43

34. The South Asia University is situated in the city of : **[June-2015]**

(a) Colombo (b) Dhaka
(c) New Delhi (d) Kathmandu

35. Which of the following universities/institutes is ranked first in the India Rankings 2016? **[August-2016]**

(a) Jawaharlal Nehru University, New Delhi
(b) Central University, Hyderabad
(c) Indian Institute of Science, Bangalore
(d) Institute of Chemical Technology, Mumbai

36. Which of the following statements are correct about deemed universities ? **[January-2017]**

(A) The Governor of the State is the chancellor of deemed universities.
(B) They can design their own syllabus and course work.
(C) They can frame their own guidelines regarding admission and fees.
(D) They can grant degrees.

Select the correct answer from the codes given below :

Codes :

(a) (A), (B) and (C) (b) (B), (C) and (D)
(c) (A), (C) and (D) (d) (A), (B), (C) and (D)

37. In which of the following Ancient Indian universities, the culture and civilization of Tibet was built mainly through the writings of the scholars? **[20th June 2019-IInd Shift]**

(a) Nalanda (b) Vikramsila
(c) Jagaddala (d) Mithila

38. A special focus on the problems of examination system of India formed a part of which one of the following reports? **[20th June 2019-IInd Shift]**
(a) Report of the Calcutta university commission.
(b) Report of the University Education commission (1964-66).
(c) Hartog committee report.
(d) Report on standards of University education UGC (1965).

39. During which year the present system of affiliation of colleges to the Universities was introduced in India? **[20th June 2019-Ist Shift]**
(a) 1857 (b) 1948
(c) 1928 (d) 1966

40. In which year the modern Indian University got established? **[24th June 2019-IInd Shift]**
(a) 1957 (b) 1857
(c) 1947 (d) 1964

41. In which era given below, higher education in India got a set back? **[24th June 2019-IInd Shift]**
(a) British Era (b) Buddhist Era
(c) Mughal Era (d) Post-Independence Era

42. The medium of instruction in the vedic system of education has been **[25th June 2019-Ist Shift]**
(a) Sanskrit (b) Pali
(c) Hindi (d) Urdu

43. The purpose of Gurukul system of education is to **[26th June 2019-IInd Shift]**
(a) Promote equality and excellence
(b) Minimise stress in learning
(c) Empowering for future learning
(d) Encourage self-help

44. In post-independence India, which one of the following committee/commission's report deals with all levels of education in India? **[24th June 2019-Ist Shift]**
(a) Sargeant commission
(b) Hartog committee
(c) Kothari commission
(d) Radhakrishnan commission

45. Which one of the following reports addressed the academic, technical and administrative problems of the examination system? **[20th June 2019-Ist Shift]**
(a) Report on standards of the Educational System (1965)
(b) Report of University Education Commission (1948-49)
(c) Sargent Report (1944)
(d) Hartog Committee report (1929)

46. Which of the following modes of admission was prevalent in Nalanda University in ancient times? **[2nd Dec. 2019-IInd Shift]**
(a) Entrance Examination
(b) Interview
(c) Good Academic Credentials
(d) Peer Discussion

47. Select the period in which India became a centre of higher learning. **[4th Dec. 2019-IInd Shift]**
(a) Gupta Period (b) Buddha Period
(c) Mughal Period (d) British Period

48. Match the following historic places with their distinguishing discipline of learning **[4th Dec. 2019-IInd Shift]**

List I Historic places	List II Discipline
(A) Takshila	(i) Astronomy
(B) Uijain	(ii) Buddhism
(C) Sarnath	(iii) Art, Architecture and Painting
(D) Ajanta	(iv) Medicine

Choose the correct option from those given below:
(a) (A)-(i), (B)-(i), (C)-(iii), (D)-(iv)
(b) (A)-(ii), (B)-(i), (C)-(iv), (D)-(iii)
(c) (A)-(iii), (B)-(iv), (C)-(ii), (D)-(i)
(d) (A)-(iv), (B)-(i), (C)-(ii), (D)-(iii)

49. Who among the following, first took the initiative for appointing a University Education Commission during pre-independence period? **[5th Dec. 2019-Ist Shift]**
(a) Lord Curzon (b) Lord Ripon
(c) Lord Wellesley (d) Lord Bentick

50. In the age of four Vedas, students were admitted to the Vedic schools after performance of which ceremony, among the following: **[6th Dec. 2019-Ist Shift]**
(a) Upanayana ceremony
(b) Utsarjana ceremony
(c) Satapatha ceremony
(d) Dhanurvidya ceremony

51. In order to meet the new demands of market economy and produce competent graduates, who can compete with their counterparts in international markets, the first and foremost change that needs to be introduced in the prevailing system of Indian higher education is related to: **[6th Dec. 2019-Ist Shift]**
(a) Admission process
(b) Curriculum
(c) Educational technology
(d) Appointment of teachers

52. Who among the following scholars carried back scriptures from Nalanda University and wrote about architecture and learning of this university? **[6th Dec. 2019-IInd Shift]**
(a) Kim Huang (Korea) (b) Jin Tan Yang (Korea)
(c) Xuan Zang (China) (d) Junha Meng (China)

53. The Ancient Indian University known as the chief centre for advanced and specialized studies in Nyaya or Logic was **[2nd Dec. 2019-Ist Shift]**
(a) Jagaddala University (b) Mithila University
(c) Nadia University (d) Valabhi University

54. Which one of the following groups of commission on education has been given chronologically in an order of year in which they were constituted?

[5th Dec. 2019-Ist Shift]

(a) Kothari Commission, Mudaliar Commission, Radhakrishnan Commission

(b) Radhakrishnan Commission, Mudaliar Commission, Kothari Commission

(c) Mudaliar Commission, Kothari Commission, Radhakrishnan Commission

(d) Radhakrishnan Commission, Kothari Commission, Mudaliar Commission

55. Match the List-I containing name of the Commissions with List-II containing the Recommendation of that commission

[5th Dec. 2019-IInd Shift]

List I (Commissions)	**List II (Recommendation)**
(A) Radhakrishnan Commission	(i) Introduction of 3 years of secondary and 4 years of higher education system
(B) Mudaliar Commission Integrating seoondary and higher	(ii) Restructuring curriculum for multi disciplinary professionals
(C) Kothari Commission	(iii) Integrating secondary and higher education
(D) Sam Pitroda Commission	(iv) Three years of degree and 4 years of honours degree courses

(a) A-i; B-ii; C-iii, D-iv (b) A-ii; B-i; C-iii, D-iv

(c) A-iii; B-i; C-iv; D-ii (d) A-i; B-ii; C-iv, D-iii

HINTS & EXPLANATION

1. (a) UNESCO's declared purpose is to contribute to peace and security by promoting international collaboration through educational, scientific, and cultural reforms.

2. (b) The headquarters of the international court of justice is located at Hague, Netherlands.

3. (b) The Council of Scientific and Industrial Research abbreviated as CSIR was established by the Government of India in September of 1942 as an autonomous body that has emerged as the largest research and development organisation in India.

4. (a) Indian Council of Historical Research - New Delhi under the Ministry of HRD

The Indian Institute of Advanced Study (MAS) - Shimla, Himachal Pradesh

Indian Council of Philosophical Research (ICPR) – Lucknow

The Central Institute of Coastal Engineering for Fishery (CICEF) - Bangalore

5. (d) Kalhana, born in Baramulla district of Jammu & Kashmir, is regarded as the first historian of India. Between CE 1148 to 1150, he chronicled the sequential history of the kings and queens of the 12th century Kashmir detailing the sculpture, architecture, coinage, and manuscripts, etc., in a Sanskrit poetic composition of 7,826 verses, set in eight cantos of varying length; each a Taranga or a wave of the Rajtarangini—the royal river.

6. (c) National Bal Bhavan is an autonomous body under the ministry of Human Resource Development (HRD).

7. (a) The University Grants Commission was constituted on the recommendation of Dr. Sarvapalli Radhakrishnan Commission.

8. (a) Central universities are established by an Act of Parliament and are under the purview of the Department of Higher Education in the Union Human Resource Development Ministry.

9. (a) Central Institute of English – Hyderabad

Gramodaya Vishwavidyalaya – Chitrakoot and Foreign Languages

Central Institute of Higher Tibetan Studies – Dharmasala

IGNOU – New Delhi

10. (c) Mahatma Gandhi Antarrashtriya Hindi Vishwavidyalaya is a Central University located in Wardha, Maharashtra.The university came into existence through an Act of Parliament which received the assent of the President on 8 January 1997.

11. (d) The University Grants Commission (UGC) is a statutory body set up by the government in accordance to the UGC Act 1956 under Ministry of Human Resource Development, and is charged with coordination, determination and maintenance of standards of higher education.

12. (a) Dr. Hari Singh`W Gour University– Sagar

S.N.D.T University – Mumbai

M.S. University – Baroda

J.I.M. Vyas University– Jodhpur

13. (d) The Indian Institute of Advanced Study is a research institute based in Shimla, India. It was set up by the Ministry of Education, Government of India in 1964 and it started functioning from 20 October 1965.

14. (a) The National Council for Women, working to develop the condition socio-economic status of women in India. Chaired by Durgabai Deshmukh the National Council of Women was established in 1958.

15. (d) The National Museum at New Delhi is attached to part of Ministry of Tourism and Culture.

16. (a) According to Radhakrishnan Commission, the aim of Higher Education is to develop the democratic values, peace and harmony.

17. (a) Central Arid Zone Institute – Jodhpur
Space Application Centre– Ahmedabad
Indian Institute of Public Administration – New Delhi
Headquarters of Indian Science Congress – Kolkata

18. (d) Dual mode universities are those universities that offer education with the support of both modes—conventional (regular) and non-conventional modes. Dual Mode Universities offer regular campus-based programs as well as distance learning programs like the University of Delhi (DU) and University of Mumbai.

19. (a) National Education Commission also known as Kothari Commission, was set up by the Government of India to examine all aspects of the educational sector in India, to evolve a general pattern of education and to advise guidelines and policies for the development of education in India.

20. (d) The Indira Gandhi National Open University (IGNOU) has relaunched its educational broadcast channel Gyan Darshan through webcasting along with its Electronic Media Production Centre (EMPC) page on Facebook. The Electronic Media Production Centre (EMPC) serves as a Nodal Resource Centre in production, dissemination and transmission of educational software in the country, utilising a wide range of communication media. This makes the IGNOU programmes available on mobile phones, too.

21. (b) The National Assessment and Accreditation Council (NAAC) is an organisation that assesses and accredits higher education Institutions (HEIs) in India. On the other hand, the National Board of Accreditation (NBA), India was initially established by AICTE (All India Council of Technical Education) under section 10(u) of AICTE act for periodic evaluations of technical institutions & programs basis according to specified norms and standards as recommended by AICTE council.

22. (a) India's first defence university, the Indian National Defence University (INDU), will take about seven years to come up and the land acquisition process at Binola in Gurgaon district of Haryana has begun.

23. (a) India's first open university was Dr. B.R. Ambedkar Open University, also known as Telangana Open University. It is a public university in the city of Hyderabad, Telangana.

24. (b) UGC is headquartered in New Delhi, and six regional centers are in Pune, Bhopal, Kolkata, Hyderabad, Guwahati and Bangalore.

25. (b) India has the highest number of students in colleges after the U.S.A.

26. (a) OBC students category was the one in which the enrolment of students in higher education in 2010-11 was beyon

27. (d) St Stephen's College, being a minority institution, follows its own admission policy.

28. (a) German Social Scientists Verstehen is a German term that means to comprehend the nature and significance of a phenomenon; and to grasp the meaning intended or expressed by another. Weber used the term to refer to the social scientist's attempt to understand both the intention and the context of human action.

29. (d) Virtual university in India provides higher education programs through electronic media, typically the Internet. The first virtual university in India came up in Tamil Nadu.

30. (b) The Meta University concept is based on the premise that 'Whole is Greater than Sum of Parts'. It allows students to move between various universities.

31. (a) Pondicherry University, Vishwa Bharati AND H.N.B. Garhwal University are central universities. Central Universities are established by an Act of Parliament and at present, there are 47 Central Universities in the country. Kurukshetra University is a member of Association of Commonwealth Universities.

32. (b) The maximum number of fake institutions / universities as identified by the UGC in the year 2014 is in Uttar Pradesh.

33. (d) The total number of central universities in India as on April 2015 was 43.

34. (c) South Asian University (SAU) is an International University sponsored by the eight Member States of the South Asian Association for Regional Cooperation (SAARC). The eight countries are: Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. Its temporary campus is in New Delhi.

35. (c) Indian Institute of Science, Bangalore ranked first with 91.81 score.

36. (b) Deemed Universities can design their own syllabus and course work. They can frame their own guidelines regarding admission and fees. They can also grant degrees. The parent Universities of these deemed universities cannot control their administration, though the degrees of deemed universities are awarded by the parent universities. However many deemed universities are allowed to award degrees under their own name.

37. (b) Vikramashila was founded by Pāla king Dharmapala in the late 8th or early 9th century. It is known to us mainly through Tibetan sources, especially the writings of Tāranātha, the Tibetan monk historian of the 16th–17th centuries.

38. (d) Report on standard of university education UGC 1965.

39. (a) India's contemporary university system started in 1857 with the establishment of three public universities in the 'presidency headquarter' cities of Chennai, Kolkata and Mumbai.

40. (b) The three oldest modern universities in India are the University of Madras, the University of Calcutta and the University of Mumbai that was established in 1857.

41. (c) Muhammadan rulers and the succeeding Mughal rulers brought changes in the Ancient Indian education. A well developed popular system of education was not existed during the Muhammadan and the Mughal period.

42. (a) The ancient systems of education were based on the Vedas and therefore it was given the name of Vedic Educational System. Ancient education emerged from the Vedas. They are supposed to be the source of Indian philosophy of life. During that period Sanskrit was the Medium of Instruction. The ancient system of teaching was listening (Shruti). There were mainly three steps of learning according to Vedic system. Sravana, the first

step meant listening towards the texts as uttered by the teacher. The second step was Manana i.e. to internalize or to assimilate what was given to the pupil. The third step was Nididhyasana (Meditation) by which truth is realised and attained. It was considered indispensable for the realization of the Supreme Reality.

43. (a) The Gurukul system is an ancient learning method which has existed since the vedic age. Its main motto is to develop the knowledge and it was highly focused on education.

44. (c) The Education Commission under the chairman of Kothari was appointed by the Government of India by resolution on 14 July 1964 to advise Government on the national pattern of education. The Commission set up 12 Task Forces on: (1) School Education; (2) Higher Education; (3) Technical Education; (4) Agricultural Education; (5) Adult Education; (6) Science Education and Research; (7) Teacher Training and Teacher Status; (8) Student Welfare; (9) New Techniques and Methods; (10) Manpower; (11) Educational Administration; and (12) Educational Finance.

45. (a) National *Education Commission* (1964-1966), popularly known as *Kothari Commission* was set up on 14th July 1964. It aimed at examining all aspects of the educational sector across the country. The Commission advised the Government on national pattern of education and on the general principles and policies for the development of education at all stages and in all its aspects.

46. (a) Nalanda University was one of the earliest Universities in the world founded in the fifth century by Gupta ruler Kumargupta. The curricula of the university offered the study of abstract knowledge like Philosophy, religion, Buddhism and scientific thoughts in astronomy, mathematics, anatomy etc. in each classroom, there used to be hundreds of students and they were not allowed to go outside until the lecture was over. Only students receiving higher education could get admission here. The first student had to take the exam for admission. Entrance was possible only after passing it. There were 2,000 teachers to teach 10,000 students here.

47. (a) The Period of Gupta rulers was the centre of higher learning. They encouraged higher learning by patronizing centers of higher education at Nalanda, Takshila, Ujjain, Vikramshila and Vallabhi. Each university specialized in a particular field of study. During the Gupta period India became a centre for higher studies by attracting scholars from all parts of India and from several foreign countries.

48. (d) Takshashila University is the most famous and the world's first university. It was established 2700 years ago in Taxila. The University offered different courses in various fields such as Vedas, Grammar, Philosophy, Ayurveda, Agriculture, Surgery, Politics, Archery, Warfare, and Commerce. Sarnath is a Buddhist pilgrim spot located near Varanasi. Ajanta is famous for vits Art, architecture and Paintings. It contains the famed paintings of Bodhisvattas Padmapani and Vajrapani along with a seated figure of Buddha in dharma chakra.

49. (a) In 1902, on the instructions of **Lord Curzon**, The Indian Universities Commission was appointed to make recommendations for reforms in **University education** in India. Appointed following a conference on education at **Simla** in September 1901, the Commission was led by Law member Thomas Raleigh and included among its members **Syed Hussain Belgrami** and Justice **GurDas Banerjee**.

50. (a) In the age of four Vedas, the students were admitted to the Vedic schools after the performance of the Upanayana ceremony (this marked the entrance of the pupil into the house of his teacher for learning) at the age of 12 and spent as many years at the residence of their teachers as brahmācharis.

51. (b)

52. (c) The profound knowledge of Nalanda's teachers attracted scholars from places as distant as China, Korea, Japan, Tibet, Mongolia, Turkey, Sri Lanka, and South East Asia. These scholars have left records about the ambience, architecture, and learning at this unique university. The most detailed accounts have come from Chinese scholars and the best known of these is Xuan Zang who carried back many hundred scriptures which were later translated into Chinese.

53. (b) India has a rich tradition of learning and education right from the antiquity. During Buddhist period there some important universities such as Taxila, Nalanda, Vallabhi, Vikramshila, Odantpuri, Nadia, Mithila and Jagaddala were established. They have different specialities. Mithila had been important centre of learning and literature, fine arts, scientific subjects and Nyaya Shastra were taught there. Gangesha Upadhya founded a shool of New logic (Navya Nyaya) there.

54. (b) Dr. S. Radhakrishnan Commission was appointed on November, 1948 to study the problems of the University education in India. Commission submitted its report in August, 1949.

Dr. L.S. Mudaliar was appointed on September 23, 1952. Kothari Education Commission was set up by *government* of India on 14th July 1964. The objective of this Commission was to examine the different aspects of education system in India.

55. (c)

(a)	Radhakrishnan Commission	(iii)	Integrating secondary and higher education
(b)	Mudaliar Commission	(i)	Introduction of 3 years of secondary and 4 years of higher education system
(c)	Kothari Commission	(iv)	Three years of degree and 4 years of honours degree courses
(d)	Sam Pitroda Commission	(ii)	Restructuring curriculum for multi disciplinary professionals Integrating seoondary and higher

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CHAPTER 45

Evolution of Higher Learning and Research in Post Independence India

Higher learning means the education beyond the level of post higher secondary education. It refers to colleges and universities. It also includes professional schools in the field of Law, Theology, Medicine, Business, Music and Art, Teachers' Training Schools and Technological Institutions. Moreover, institutions for training of highly skilled specialists in the field of economics, science, technology and culture of various types of higher levels are treated as Higher Educational Institutions.

When India got independence, the government initiated a planned development of higher education in the country particularly with the establishment of University Grant Commission in 1953.

From 1947 the government of India also appointed three important commissions for suggesting educational reforms. The University Education Commission of 1949 made valuable recommendations regarding the reorganization of courses, techniques of evaluation, media of instruction, student services, and the recruitment of teachers. The Secondary Education Commission of 1952–53 focused mainly on secondary and teacher education. The Education Commission of 1964–66 made a comprehensive review of the entire field of education. It developed a national pattern for all stages of education. The commission's report led to a resolution on a national policy for education, formally issued by the government of India in July 1968. This policy was revised in 1986.

RADHAKRISHNAN COMMISSION (UNIVERSITY EDUCATION COMMISSION) 1948

Government of India formed the University Education Commission under the Chairmanship of Dr. Sarvapalli Radhakrishnan, a distinguished scholar and former vice-chancellor of Banaras Hindu University and who became the second President of India to go into the problems and prospects of Indian University Education.

UNIVERSITY GRANT COMMISSION (UGC)

The UGC, however, was formally established only in November 1956 as a statutory body of the Government of India through an Act of Parliament for the coordination, determination and maintenance of standards of university education in India. In order to ensure effective region-wise coverage throughout the country, the UGC has decentralised its operations by setting up six regional centres at Pune, Hyderabad, Kolkata, Bhopal, Guwahati and Bangalore.

Note: The Government is planning to replace University Grant Commission (UGC) with a new Higher Education Commission of India (HECI).

HECI will be governed by a commission headed by a chairperson and vice-chairperson selected by a committee which will include the Cabinet Secretary and Higher Education Secretary (HRD).

KOTHARI COMMISSION (1964-66)

The report of Dr. D. S. Kothari, then Chairman, University Grants Commission is one of the most important documents on Education in India. The Education Commission (1964-66) under the chairmanship of Dr. D. S. Kothari, also known as Kothari Commission. The report made very important recommendations covering all aspects for the future development of national education. The Report emphasised the need for a built-in flexibility in the system of education, and for the necessity of education to be science-based and coherent with Indian culture and values. It also visualised education as an instrument for the nation's progress, security and welfare.

THE NATIONAL POLICY ON EDUCATION 1986

In 1968, when the National Policy of Education was formulated for improving the educational scenario in our country, there it was envisaged that it would be followed by a 'five yearly review to progress and working out of new policies and programmes. The policy had laid importance on higher education, particularly on graduate, post-graduate and research work. It suggested that Autonomous Colleges should be established according to UGC directives. Technical institutes like medical, engineering, agriculture universities etc. should be set up and development of Vocational skill was to be stressed upon. Besides these, the AICTE (All India Council of Teacher Education) had laid down norms and standards for diploma, degree and Post Graduate courses in the various fields.

NPE and its Revised Policy have to develop some conditions relating to the Open University system and distance mode of learning.

The Policy envisaged that the rural universities and institutions should be developed in rural areas after studying the needs of such pattern of educational institutions in rural communities as well as also strengthening the programme of Gandhian Basic Education.

NPE also envisaged that some job-oriented degree courses as well as skill oriented courses should be made for promoting human capital in the state as well as in the nation.

NPE emphasized on research as an essential component of higher education because of its role in creating new knowledge and insights imparting innovations and dynamism to the educational process.

NPE and POA made the strategies to promote women education:

The NPE and POA envisaged that adult education would be a means for reducing economic, social and gender disparities. It emphasized to eradicate illiteracy, particularly in the age group of 15-35 through various means, with special emphasis on total literacy campaigns.

The new programmes of teacher-education should emphasize need to continuing education and also the need for teachers to meet the thrusts envisaged in this Policy. District Institutes of Education and Training (DIET) should be established with the capability to organize pre-service and in-service courses for elementary school teachers and for the personnel working in non-formal and adult education.

According to the NPE and POA, educational planning should be linked to manpower planning. For this, such mechanism should be set up that can link the need based requirement of the society with what it has at present.

EXERCISE

1. In which year the University Grants Commission was established ? **[December-2004]**
(a) 1948 (b) 1944
(c) 1953 (d) 1960

2. What is the name of the Research station established by the Indian Government for 'Conducting Research' at Antarctic? **[June-2006]**
(a) Dakshin Gangotri (b) Yamunotri
(c) Uttari Gangotri (d) None of the above

3. Ministry of Human Resource Development (HRD) includes: **[June-2006]**
(a) Department of Elementary Education and Literacy
(b) Department of Secondary Education and Higher Education
(c) Department of Women and Child Development
(d) All the above

4. Which one of the following is the oldest Archival source of data in India ? **[June-2010]**
(a) National Sample Surveys (b) Agricultural Statistics
(c) Census (d) Vital Statistics

5. **Read the following statements – one labelled as Assertion (A) and the other as Reason (R) :** **[September-2013]**

Assertion (A) : Qualitative research in India has a long way to go to reach international standards.

Reason (R) : Because the funding agencies do not support qualitative research in academic institutions.

Find the correct answer from the codes given below :
(a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
(c) (A) is true, but (R) is false.
(d) Both (A) and (R) are false.

6. Which of the following institutions are empowered to confer or grant degrees under the UGC Act, 1956? **[December-2014]**
(A) A university established by an Act of Parliament.
(B) A university established by an Act of Legislature.
(C) A university / institution established by a linguistic minority.
(D) An institution which is a deemed to be university.

Select the correct answers from the codes given below:
(a) (A) and (B) (b) (A), (B) and (C)
(c) (A), (B) and (D) (d) (A), (B), (C) and (D)

7. "Education is the manifestation of perfection already in man" was stated by **[December-2014]**
(a) M. K. Gandhi (b) R. N. Tagore
(c) Swami Vivekanand (d) Sri Aurobindo

8. The Gross Enrolment Ratio (GER) in institutions of higher education in India at present (2015) is about: **[June-2015]**
(a) 8 percent (b) 12 percent
(c) 19 percent (d) 23 percent

9. **Assertion (A):** The purpose of higher education is to promote critical and creative thinking abilities among students.

Reason (R) : These abilities ensure job placements.

Choose the correct answer from the following code : **[July-2016]**
(a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).
(c) (A) is true but (R) is false.
(d) (A) is false but (R) is true.

10. In which year Secondary Education Commission was appointed under the chairmanship of Dr. A.L. Mudaliar? **[December-2018]**
(a) 1951 (b) 1962
(c) 1952 (d) 1950

11. The Washington Accord, an international agreement for engineering accreditation bodies, has Indian representation through: **[December-2018]**
(a) UGC
(b) NBA
(c) NAAC
(d) Higher Education Council of India

12. Which one of the following coordinates, promotes and funds research activities of all social sciences disciplines? **[20th June 2019-IInd Shift]**
(a) ICPR, New Delhi
(b) IIAS, Shimla
(3) ICSSR, New Delhi
(d) NUEPA, New Delhi

13. The premier organisation established in India to deal with capacity building and research in planning and management of education in India and South Asia is: **[21st June 2019-Ist Shift]**
(a) AIU (b) SAARC University
(c) NUEPA (d) Nalanda University

14. Through which Act University Grants Commission came into existence? [**21st June 2019-IInd Shift]**
(a) UGC Act – 1956 (b) UGC Act – 1949
(c) UGC Act – 1944 (d) UGC Act – 1968

15. Which discipline has the highest percentage of enrolment in the higher education of India? **[25th June 2019-IInd Shift]**
(a) Arts
(b) Science
(c) Commerce
(d) Technology and Engineering

16. Which of the following statements represent the main functions of UGC? **[26th June 2019-Ist Shift]**
(i) Recognition of institutions
(ii) Maintenance of quality and standards
(iii) Appointment of Vice Chancellor
(iv) Giving grants to institutions
(v) Making state governments responsible for educational development
Choose the correct answer from the options given below:
(a) (i), (ii) and (iii) (b) (i), (iii) and (iv)
(c) (i), (ii) and (iv) (d) (ii), (iii) and (v)

17. Which of the following commission/committee in the post-independent India has paid attention all the levels of education? **[26th June 2019-IInd Shift]**
(a) Radhakrishnan Commission
(b) Mudaliar Commission
(c) Kothari Commission
(d) Acharya Rammurthi Committee

18. National Curriculum framework was developed by which of the following? **[25th June 2019-Ist Shift]**
(a) UGC (b) NCERT
(c) NCTE (d) CBSE

19. Identify the 'NITI Aayog — Three Year Action Agenda Items' related to the field of Higher Education: **[2nd Dec. 2019-Ist Shift]**
(i) Autonomy for top colleges
(ii) Reform of the regulatory system
(iii) Establishing 3 system of project and scholar-specific research grants
(iv) Promotion of research culture
(v) National Research Foundation
Select correct answers from the options given below:
(a) (i), (ii) and (iii) (b) (ii), (iii) and (iv)
(c) (iii), (iv) and (v) (d) (iv), (i) and (ii)

20. From the following, identify the organisation that provides a common platform to all universities including institutions of national importance: **[2nd Dec. 2019-IInd Shift]**
(a) University Grants Commission
(b) Association of Indian universities
(c) Distance Education Council
(d) Indian Institute of Advanced Study

21. Which of the following statements is true in the Indian context? **[4th Dec. 2019-Ist Shift]**
(a) Autonomous colleges can grant degrees independent of universities
(b) Autonomous colleges can grant only bachelors degree independent of universities
(c) Except doctoral degrees, all other degrees and diplomas can be granted by autonomous colleges
(d) Whatever may be the degree or diploma, autonomous colleges can grant them under their own name but under the seal of an affiliated university

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1. (c) The University Grants Commission (UGC) was formally inaugurated by late Abul Kalam Azad, the then Minister of Education, Natural Resources and Scientific Research on 28 December 1953.

2. (a) Dakshin Gangotri was the first scientific base station of India situated in Antarctica, part of the Indian Antarctic Programme. This was the first time an Indian team spent a winter in Antarctica to carry out scientific works.

3. (d) The Ministry includes department of School Education and Literacy, which deals with primary, secondary and higher secondary education, adult education and literacy, and the Department of Higher Education, which deals with university education, technical education, scholarship etc. The Department of Women and Child Development was set up in the year 1985 and with effect from 30.01.2006, it has been upgraded to a Ministry.

4. (c) Census in India began in 1872 and has been conducted every 10 years. The first complete census was taken in the year 1881. Post 1949, it has been conducted by the Registrar General and Census Commissioner of India under the Ministry of Home Affairs, Government of India.

5. (c) (a) is true, but (R) is false.
There are several reasons other than inadequate funds because of which qualitative research in India lags behind international standards.

6. (c) Institutions which are empowered to confer or grant degrees under the UGC Act, 1956 are –
- A university established by an Act of Parliament.
- A university established by an Act of Legislature.
- An institution which is a deemed to be university.

7. (c) Swami Vivekananda.

8. (c) The Gross Enrolment Ratio (GER) in institutions of higher education in India at present (2015) is about 19 percent.

9. (b) Both (a) and (R) are true but (R) is not the correct explanation of (a).

10. (c) The Government of India set up, the Secondary Education Commission by Resolution dated 23rd September, 1952, under the Chairmanship of Dr. A. Lakshmanaswami Mudaliar, the Vice-Chancellor of the Madras University.

11. (b) National Board of Accreditation, India has become the permanent signatory member of the Washington Accord on 13th June 2014. The NBA accredited programs offered by the Tier -1 Institutions are eligible for the recognition of the programs by other signatories of the Washington Accord.

12. (c) Indian Council of Social Science Research (ICSSR) was established in the year of 1969 by the Government of India to promote research in social sciences in the country. It provides grants for projects, fellowships, international collaboration, capacity building, survey, publications etc. to promote research in social sciences in India.

13. (c) The NUEPA as an autonomous organization emphasizes on planning, management and capacity building in educational policy, through research, training, consultancy and dissemination. The NUEPA structure is based on nine academic and one administrative unit.

14. (a) The University Grants Commission (UGC) came into existence on 28th December, 1953 and became a statutory Organization of the Government of India by an Act of Parliament in 1956, for the coordination, determination and maintenance of standards of teaching, examination and research in university education. In order to ensure effective region-wise coverage throughout the country, the UGC has decentralised its operations by setting up six regional centres at Pune, Hyderabad, Kolkata, Bhopal, Guwahati and Bangalore. The head office of the UGC is located at Bahadur Shah Zafar Marg in New Delhi.

15 . (a)

16. (c) The University Grants Commission (UGC) of India is a statutory organisation set up by the Union government in 1956, charged with coordination, determination and maintenance of standards of university education. It provides recognition to universities in India, and disburses funds to such recognized universities and colleges. Its other prime functions are serving as a vital link between the Union and state governments and institutions of higher learning and advising the Central and State governments on the measures necessary for improvement of university education.

17. (c) The Kothari Commission aimed at examining all aspects of the educational sectors across the country. Among other objectives, it also included evolution of a general pattern of education.

18. (b) The National Curriculum Framework 2005 is one of the four National Curriculum Frameworks published in 1975, 1988, 2000 and 2005 by the National Council of Educational Research and Training NCERT in India. It provides framework for making the textbooks and setting syllabus for the books which are published by NCERT and read by students in most of the Indian schools. It focuses on making books interesting for the students and to inculcate a habit of reading books. It also focuses to shift education from rote learning to understanding.

19. (a) After the dissolution of the Planning Commission, the government decided to set its development priorities and instrumentalise those priorities through the NITI Aayog. Niti Aayog in its Three Year Action Agenda 2017-18 to 2019-20, have mentioned that the government needs to create 20 world-class universities, provide autonomy for top colleges and universities, reform the regulatory system, establish system of project-/researcher-specific grants and increase focus on vocational and profession-led education.

20. (b) Association of Indian universities (AIU) is a registered society under the Societies Registration Act, 1860 with membership of Indian Universities. It provides a common forum for administrators and academicians of member universities to exchange views and discuss matters of common concern.

21. (d) As per the guidelines of UGC, autonomous colleges are granted freedom in some or all the matters. They can have their own syllabus, evaluation patterns etc. Autonomous colleges are affiliated by any Government university and they can grant award under their own name but under the seal an affiliated university.

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CHAPTER 46

Oriental, Conventional and non-Conventional Learning Programmes in India

Emergence of Orientalism

Emergence of Orientalism, as a field of scholarship, first emerged in the eighteenth century, when European scholars of the enlightenment period consciously studied Asian languages and cultures to gain a richer understanding of the Middle Eastern literary and historical environment in which Judaism and ultimately Christianity emerged.

An 'Orientalist' is a specialist in oriental subjects and in other words an Orientalist one engaged in oriental languages and literature.

Oriental Research Institutes of India

Oriental Research Institutes are institutions especially devoted to Indological studies. Indology is the science of study of culture in all its aspects. With the disappearance of the Gurukula system and the ancient universities like those at Nalanda and Takshila and also the gradual dissolution of the powerful kingdoms by conquests from outside, it became necessary to evolve a method by which the ancient knowledge and wisdom of the country could be revived and preserved. **Some Oriental Research Institutes of India are Adyar Library and Research Center, Asiatic Society, Bhandarkar Oriental Research Institute, Ganganath Jha Kendriya Sanskrit Vidyapeeth, Kuppuswami Sastri Research Institute, Madras Sanskrit College, Chennai, Mythic Society, Bangalore, Oriental Institute, Baroda, Oriental Manuscripts Library, Tiruvanantapuram or Trivandrum, Oriental Research Institute, Mysore, Oriental Research Institute, Tirupati, The Government Sanskrit College, Kolkata and Vishveshvaranand Vishvabandhu Institute of Sanskrit and Indological Studies, Hoshiarpur.**

Conventional Learning Programmes in India

Conventional learning refers to conventional teaching and learning within a brick-and-mortar classroom facility. It is also known as traditional education or customary education.

India is having one of the largest system of tertiary education with more than 300 university level institutions (single and dual mode universities that include central and state universities, deemed- to-be universities, institutions of national importance, open universities), 14 000 colleges, 9 million students and 0.4 million teachers.

At present, the main categories of University/University-level Institutions are :- Central Universities, State Universities, Deemed-to-be Universities and University-level institutions.

These are described as follows:

Central University, State University, Private University, Deemed-to-be University, Institution of National Importance, Institution under State Legislature Act.

Conventional Teaching Methods

The term conventional teaching" relies mainly on a method that utilizes textbooks, lecture notes, memorization and recitation techniques. Delivering education through a traditional format sees no priority in catering to the rich and diverse learner population or the need to develop critical thinking, problem solving, and decision making skills, but instead directs learners to assume a non-thinking and information-receiving role. It is a largely functional procedure which focuses on skills and area of knowledge in isolation. Assessment in the traditional method of teaching, is seen as a detached entity and occurs only through examination, while with modern methods of teaching, assessment is seen as an activity which is creatively embedded into teaching and learning.

Non-Conventional Learning Programmes in India

The Indian Education system is vast in size, as well as its academic offerings. A vibrant and diverse education system means a wide variety of courses are available from the modern and cutting edge to the traditional.

Non-conventional learning and education is includes night classes, online classes, personal enrichment and lifelong learning, independent study and more. Non-conventional learning and education is education that is offered in ways other than common daytime college classrooms.

Development and Importance Non-Conventional Learning Programmes in India

In view of the requirements of the 21st century, the aim of a quality university or college education must be to develop good, well rounded, and creative individuals.

Quality higher education must enable personal accomplishment and enlightenment, constructive public engagement, and productive contribution to society.

Higher education must form the basis for knowledge creation and innovation in the nation and thereby contribute deeply to a growing national economy.

The structure, curriculum, and processes of higher education must all work together coherently towards attaining all of these characteristics in order to deliver its lofty end goals.

Types of Non-Conventional Learning Programmes

IT Enabled Transformation of Education and learning, e-learning, Open and Distance Learning (ODL), Distance Education (DE), Open Learning

Non-Conventional Courses Offered by Indian Universities

As India rolled into the 21st century, this generation has broken the chains of conventional doctor-engineer-MBA paths drawn out by a more rigid society of the past, and replaced the cookie-cutter thought process with a slightly more inspired one. Creative courses are now abundant, widening the scope of career choices in India and making alternate journeys in a life a possibility. With new avenues and opportunities on the horizon, India's youth is expanding the definition of learning.

EXERCISE

1. **Assertion (A) :** The U.G.C. Academic Staff Colleges came into existence to improve the quality of teachers.
Reason (R) : University and college teachers have to undergo both orientation and refresher courses.
[December-2009]
(a) Both (A) and (R) are true and (R) is the correct explanation.
(b) Both (A) and (R) are correct but (R) is not the correct explanation of (A).
(c) (A) is correct and (R) is false.
(d) (A) is false and (R) is correct

2. The enrolment in higher education in India is contributed both by Formal System of Education and by System of Distance Education. Distance education contributes
[December-2009]
(a) 50% of formal system
(b) 25% of formal system
(c) 10% of the formal system
(d) Distance education system's contribution is not taken into account while considering the figures of enrolment in higher education

3. Which of the following statements are correct about the National Assessment and Accreditation Council ?
[December-2013]
1. It is an autonomous institution.
2. It is tasked with the responsibility of assessing and accrediting institutions of higher education.
3. It is located in Delhi.
4. It has regional offices.

Select the correct answer from the codes given below :
Codes :
(a) 1 and 3 (b) 1 and 2
(c) 1, 2 and 4 (d) 2, 3 and 4

4. Arrange the following books in chronological order in which they appeared. Use the code given below :
[December-2013]
(i) Limits to Growth (ii) Silent Spring
(iii) Our Common Future (iv) Resourceful Earth
Codes:
(a) (i), (iii), (iv), (ii) (b) (ii), (iii), (i), (iv)
(c) (ii), (i), (iii), (iv) (d) (i), (ii), (iii), (iv)

5. Which of the following organizations deals with "capacity building programe" on Educational Planning ?
[December-2014]
(a) NCERT (b) UGC
(c) NAAC (d) NUEPA

6. CIET stands for **[December-2014]**
(a) Centre for Integrated Education and Technology
(b) Central Institute for Engineering and Technology
(c) Central Institute for Education Technology
(d) Centre for Integrated Evaluation Techniques.

7. Which of the following statements are correct about distance education in India? **[August-2016]**
(A) It supplements formal education.
(B) It reduces the cost of education.
(C) It replaces the formal education.
(D) It enhances access to education.
Select the correct answer from the codes given below :
Codes :
(a) (A), (B), (C) and (D) (b) (A), (C) and (D)
(c) (A), (B) and (D) (d) (B), (C) and (D)

8. Which of the following are the demerits of globalisation of higher education? **[January-2017]**
(A) Exposure to global curriculum
(B) Promotion of elitism in education
(C) Commodification of higher education
(D) Increase in the cost of education
Select the correct answer from the codes given below :
Codes :
(a) (A) and (D) (b) (A), (C) and (D)
(c) (B), (C) and (D) (d) (A), (B), (C) and (D)

9. Which of the following are the goals of higher education in India ? **[November-2017]**
(A) Access
(B) Equity
(C) Quality and Excellence
(D) Relevance
(E) Value based education
(F) Compulsory and free education
Select the correct answer from the code given below:
(a) (A), (B) and (E) only
(b) (A), (B), (E) and (F)
(c) (A), (B), (C), (D) and (E)
(d) (A), (B), (C), (D), (E) and (F)

10. India has the largest Higher Education System in the World after : **[July-2018]**
(A) The United States of America
(B) Australia
(C) China
(D) United Kingdom (U.K.)
Select the correct answer from the code given below :
(a) (A), (B), (C) and (D) (b) (A), (B) and (C) only
(c) (A), (C) and (D) only (d) (A) and (C) only

11. Which scheme of Govt. of India was launched for the development of secondary education in public schools? **[December-2018]**
(a) Rashtriya Madyamik Shiksha Abhiyan
(b) Rashtriya Uchchatar Shiksha Abhiyan
(c) Global Initiative of Academic Network
(d) Sarva Shiksha Abhiyan

12. Which among the following envisaged a common educational structure like 10+2+3 as a common core in the curricular programme? **[December-2018]**
(a) Sinha Committee
(b) All India Council of Technical Education
(c) Kothari Commission
(d) National Policy on Education (NPE), 1986

13. Which one of the following forms a necessary component of Conventional Education System in India? **[21st June 2019-Ist Shift]**
(a) Learning from books
(b) Learning from the teacher
(c) Learning from thinking
(d) Learning through instructional material

14. Which one of the following five years plans of India has given special emphasis on "Education and Manpower"? **[21st June 2019-Ist Shift]**
(a) Third Five Year Plan
(b) Fourth Five Year Plan
(c) Second Fiver Year Plan
(d) Fifth Five Year Plan

15. Which of the following statements explains the concept of gross enrolment ratio? **[25th June 2019-IInd Shift]**
(a) Total number of students divided by the total population
(b) Total number of enrolled students of a particular age group divided by total population of that age group
(c) Total number of students divided by the total number of children not admitted to the institution
(d) Total number of students not admitted to the institution divided by the total number children of that age-group

16. The main aim of the faculty recharge scheme of UGC was to: **[26th June 2019-Ist Shift]**
(a) Address the shortage of faculty in higher education institution.
(b) Upgrade the teaching skills of the faculty.
(c) Upgrade the research infrastructure for the faculty in colleges and universities.
(d) Strengthen the academia – industry linkage.

17. Name the scheme which facilitates academic and research collaboration between Indian Institution and the best institution in the world. **[26th June 2019-Ist Shift]**
(a) ICSSR - IMPRESS
(b) Staff Development Scheme
(c) SPARC
(d) Institutional Development Scheme

18. Which of the following is a non-conventional learning programme in higher education? **[26th June 2019-Ist Shift]**
(a) Swayam
(b) Face-to-face teaching-learning
(c) Tutorial class
(d) Seminar

19. Which of the following is generally associated with the domain name of an educational institution? **[26th June 2019-IInd Shift]**
(a) .org (b) .edu
(c) .com (d) .inst

20. The scheme "Unnat Bharat Abhiyan" aims to **[26th June 2019-IInd Shift]**
(a) Increase strength of students in colleges in India
(b) Link higher educational institution in the country with at least 5 villages
(c) Increase quality in Higher Education
(d) Increase number of colleges in India

21. NMEICT is an acronym for **[26th June 2019-IInd Shift]**
(a) National Massive Education through Information and Communication Technology
(b) National Mission on Education through Information and Communication Technology
(c) National Multipurpose Education through Information and Communication Technology
(d) National Mode of Education through Information and Communication Technology

22. Name the scheme which aims to create research ambience in the institutes by promoting research in engineering sciences. **[25th June 2019-Ist Shift]**
(a) E- Shooth Sindhu
(b) Entrepreneurship Development Cell
(c) Research Promotion Schemes (RPS)
(d) Institution Development Scheme

23. Rashtriya Uchhatar Shiksha Abhiyan (RUSA) aims to achieve the following in Higher Education System: **[4th Dec. 2019-Ist Shift]**
(A) Equity (B) Access
(C) 50% GER (D) Excellence
Choose the correct option from those given below:
(a) (A), (B) and (C) (b) (A), (C) and (D)
(c) (A), (B) and (D) (d) (B) (C) and (D)

24. Which of the following emphasized that education needs to be managed in an atmosphere of utmost intellectual rigour, seriousness of purpose and of freedom essential for innovation and creativity'? **[2nd Dec. 2019-IInd Shift]**
(a) National Policy on Education—1968
(b) National Policy on Education—1986
(c) NITI Aayog-Three Year Action Agenda (2017-18 to 2019-20)
(d) Draft National Education Policy—2019

25. Choose the oriental learning institutes in India from the following: **[5th Dec. 2019-IInd Shift]**
(A) Asiatic Society
(B) Madras Sanskrit College
(C) Tezpur University
(D) Mythic Society
Choose the correct option:
(a) (A), (B) and (D) only
(b) (A), (B) and (C) only
(c) (A), (C) and (D) only
(d) (B) (C) and (D) only

26. Select the alternative features from the following, which make open universities as non-traditional universities : **[4th Dec. 2019-IInd Shift**
(A) Innovative method of teaching and learning
(B) Innovative method of admission, curriculum and evaluation
(C) Modern communication techniques
(D) Teachers friendly approaches
Select the correct option :
(a) (B), (C) and (D) only
(b) (A), (B) and (C) only
(c) (A), (C) and (D)only
(d) (A), (B) and (D) only

27. According to GATS (General Agreement on Trade and Services), higher education should be a commodity in the **[4th Dec. 2019-Ist Shift]**
(a) Domestic public sector
(b) Domestic private sector
(c) Non-trading sector
(d) Global marketplace

28. Match the following two sets. Set I lists the names of states, while Set II indicates state specific missions. **[2nd Dec. 2019-IInd Shift]**

Set I	Set II
(a) Andhra Pradesh	(i) Mukhya Mantri Jal Swavalainban Abhiyan
(b) Gujarat	(ii) Jalyukt Shivar Abhiyan
(c) Maharashtra	(iii) Neeti Saimrakshana Udyamam
(d) Rajasthan	(iv) Sujalam Sufalaui Jal Abhiyan

Select correct answer from the options given below:
(a) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)
(b) (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)
(c) (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)
(d) (a)-(iii), (b)-(iv), (c)-(ii), (d)-(i)

29. Which one of the following factors is a deterrent for the students to do well in higher education? **[5th Dec. 2019-IInd Shift]**
(a) Political orientation
(b) Academic strategies
(c) Comprehension ability
(d) Academic discourse

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1. (c) (A) is correct and (R) is false.

2. (d) The enrolment in higher education in India is contributed both by Formal System of Education and by System of Distance Education. Distance education contributes 25% of formal system.

3. (b) The National Assessment and Accreditation Council is an organisation that assesses and accredits higher education Institutions in India. It is an autonomous body funded by University Grants Commission of Government of India headquartered in Bangalore.

4. (*) All options are wrong. The correct sequence is – (ii), (i), (iv) & (iii).

5. (d) NUEPA

NUEPA (currently NIEPA: National Institute of Educational Planning and Administration) is a premier organization dealing with capacity building and research in planning and management of education set up by the Ministry of Education (now known as Ministry of Human Resource Development), Government of India.

The National Council of Educational Research and Training (NCERT) is an autonomous organisation set up in 1961 by the Government of India to assist and advise the Central and State Governments on policies and programmes for qualitative improvement in school education.

The NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL (NAAC) conducts assessment and accreditation of Higher Educational Institutions (HEI) such as colleges, universities or other recognised institutions to derive an understanding of the 'Quality Status' of the institution.

The University Grants Commission of India (UGC India) is a statutory body set up by the Indian Union government in accordance to the UGC Act 1956

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under Ministry of Human Resource Development, and is charged with coordination, determination and maintenance of standards of higher education. It provides recognition to universities in India, and disburses funds to such recognised universities and colleges.

6. (c) Central Institute of Educational Technology CIET, a consitituent unit of NCERT, established in the year 1984 with the merger of Centre for Educational Technology(1973) and Department of Teaching Aids(1959) has the chief aim of promoting Educational Technology especially mass media to extend educational opportunities and improve quality of educational processes at the school level.

7. (c) Distance education in India cannot replace formal education. Campus-based formal education can never be replaced by ODL.

8. (c) The demerits of globalisation of higher education include promotion of elitism in education; commodification of higher education and increase in the cost of education.

9. (c) The goals of higher education in India can be listed as follows: access, equity, quality and excellence, relevance, value based education, compulsory and free education.

10. (a) (A), (B), (C) and (D)

As per 'Universitas 21' as well as 'Quacquarreli Symonds' the leading agencies that release world rankings, India ranks below all of the mentioned four countries in terms of Higher Education System.

11. (a) Rashtriya Madhyamik Shiksha Abhiyan scheme was launched in March, 2009 with the objective to enhance access to secondary education and to improve its quality. The implementation of the scheme started from 2009-10.

12. (d) National Policy on Education (NPE) 1986 envisaged the standardization of educational system on 10+2+3 pattern, across the country.

13. (b) Traditional education, also known as back-to-basics, conventional education or customary education, refers to long-established customs that society traditionally used in schools. Historically, the primary educational technique of traditional education was simple oral recitation with the direction of teachers.

14. (b) Fourth Five Year plan (1969-1974) was launched by Indira Gandhi government. In this plan priority was given to improvement of teacher education, expansion and improvement of science education, raising standards of post graduate education and research, development of Indian languages and book production and the consolidation of technical education. It increased efforts made to involve people in educational programmes.

15. (b) the concept of gross enrolment ratio is defined as the number of students enrolled in a given level of education, regardless of age, expressed as a percentage of the official school-age population corresponding to the same level of education.

16. (a) To redress the decline in research environment in Indian Universities and stagnation of faculty and infrastructure, the Government of India, through the University Grants Commission, has decided to launch a new Programme called "UGC-Faculty Recharge Programme." The intent of the government is to ultimately induct up to 1000 faculty during the next five years with a yearly repeat cycle.

17. (c) The Scheme for Promotion of Academic and Research Collaboration (SPARC) is a Ministry of Human Resource Development initiative. It aims at improving the research ecosystem of India's higher educational institutions by facilitating academic and research collaborations between Indian institutions and the best institutions in the world from 28 selected nations to jointly solve problems of national and international relevance. Indian Institute of Technology Kharagpur is the National Coordinating Institute to implement the SPARC programme.

18. (a) SWAYAM is a program initiated by Government of India and designed to achieve the three cardinal principles of Education Policy viz., access, equity and quality. The program is done through a platform that facilitates hosting of all the courses, taught in classrooms from Class 9 till post-graduation to be accessed by anyone, anywhere at any time. The courses hosted on SWAYAM are in 4 quadrants – (1) video lecture, (2) specially prepared reading material that can be downloaded/printed (3) self-assessment tests through tests and quizzes and (4) an online discussion forum for clearing the doubts.

19. (b) The edu. domain was implemented in April 1985 as a generic top-level domain. The .edu domain was originally intended for educational institutions anywhere in the world. However, most of the institutions that obtained .edu registrations were in the United States, while non-U.S. educational institutions typically used country-level domains.

20. (b) Unnat Bharat Abhiyan aims to link the Higher Education Institutions with at least (5) villages, so that these institutions can contribute to the economic and social betterment of these village communities using their knowledge base.

21. (b) National Mission on Education through Information and Communication Technology

22. (c) Research Promotion Scheme (RPS) Promotes Research in identified thrust areas of in Technical Education. RPS is aimed to create research ambience in the institutes by promoting research in engineering sciences and innovations in established and newer technologies; and to generate Master's and Doctoral degree candidates to augment the quality of faculty and research. The limit of funding is Rs 25 Lakh for project duration of 3 years.

23. (c) Rashtriya Uchchatar Shiksha Abhiyan (RUSA) is a Centrally Sponsored Scheme launched in 2013 with objective to improve access, equity and quality in higher education through planned development of higher education at the state level. Other objectives of RUSA include creating new academic institutions, expanding and upgrading the existing ones, developing institutions that are self-reliant in terms of quality education, professionally managed, and characterized by greater inclination towards research and provide students with education that is relevant to them as well the nation as a whole.

24. (b) The National Policy on Education (NPE) 1986 was adopted by Parliament in May 1986. A committee was set up under the chairmanship of Acharya Ramamurti in May 1990 to review NPE and to make recommendations for its modifications. NPE, 1986 suggested that education needed to be managed in an atmosphere of utmost intellectual rigour, seriousness of purpose and, at the same time, of freedom essential for innovation and creativity. The Policy also envisaged that discipline be introduced into the system with immediate effect. The policy put it in simple words that for the system to work all teachers should teach and all students should study.

25. (a) Oriental Research Institutes are institutions specially devoted to Indological studies. Asiatic Society, Madras Sanskrita College and Mythic Society are some oriental learning institutes in India. 'The Asiatic Society' was started by William Jone. Madras Sanskrit College is situated in Chennai. The College was founded in A. D. 1905 by V. Krishnaswamy Iyer and started working from February 1906. Mythic Society is located in Bangalore. It is an institution devoted to the study and research of religion, philosophy, history, ethnology and culture.

26. (b)

27. (d) The primary aim of GATS, which became effective in Jan 1995, is to make all services tradable. According to GATS education services are included in one of the 12 classified service sectors. Since India has a second largest higher educational network and contributing largest share of international students therefore higher education system are kept under Global market place.

28. (d) Mukhya Mantri Jal Swavlamban Abhiyan (MJSA), campaign for water harvesting & conservation in rural areas was launched in Rajasthan. It was launched In January 2016 to make the state drought free by 2020. Maharashtra government has launched the project "*Jalyukt Shivar Abhiyaan*" in a bid to make Maharashtra a drought-free state by 2019.

On 15th August 2017, the Andhra Pradesh government launched Neeti Samrakshana Udyamam (water conservation movement), which is aimed at providing water security in the state and has a target of building 20,000 check dams in 90 days.

The government of Gujarat has launched the second edition of the water conservation scheme Sujalam Sufalam Jal Sanchay Abhiyan.

29. (a) Institutions of Higher Education usually have students' council to represent students before the administration. However, these unions invariably have political orientation; they function more or less as the trainee units of those political parties and cannot avoid their interference. All this acts as a deterrent for the students to do well.

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CHAPTER 47

Professional, Technical and Skill-based Education

Higher education is a critical contributor to sustainable livelihoods and economic development of the nation. Higher education also plays a large and equally important role in improving human well being, and developing India as envisioned in the Constitution - a democratic, just, socially conscious, self-aware, cultured, and humane nation, with liberty, equality, fraternal spirit, and justice for all.

PROFESSIONAL EDUCATION

The several disciplines in which professional courses in India are offered include Computer Science, Business Management, MBA, Medical & Pharmacy, Accounts & Finance, Teaching, Academic Courses, Media & Entertainment, Law Courses, Event Management Courses, Engineering, Technical, Language Courses, Hotel Management, Air Crew, Air Hostess Academy, Fashion Designing Courses, PhD and Research, Travel & Tourism Management etc.

TECHNICAL EDUCATION

Technical Education plays a vital role in human resource development of the country by creating skilled manpower, enhancing industrial productivity and improving the quality of life of its people. Technical Education covers programmes in engineering, technology, management, architecture, town planning, pharmacy, applied arts & crafts, hotel management and catering technology.

Technical education includes degree and diploma programmes in engineering, technology, management, architecture, town planning, pharmacy, hotel management and catering technology.

Indian Institutes of Technology (IITs)

Indian Institutes of Technology are apex institutions for engineering education and research. At present, there are twenty three Indian Institutes of Technology (IITs) viz. at Bombay, Delhi, Kanpur, Kharagpur, Madras, Guwahati, Roorkee, Hyderabad, Patna, Bhubaneshwar, Ropar, Jodhpur, Gandhinagar, Indore, Mandi, Varanasi, Tiruppati, Palakkad, Goa, Jammu, Dharwad, and Bhilai. All are governed by The Institutes of Technology Act, 1961 which has declared them as "Institutions of national importance", and lays down their powers, duties, framework for governance etc.

Indian Institutes of Management (IIMs)

The Indian Institutes of Management (IIMs) located at Ahmedabad, Kolkata, Bangalore, Lucknow, Indore, Kozhikode and Shillong are institutions of excellence, established with the objectives of imparting high quality management education and training, conducting research and providing consultancy services in the field of management to various sectors of the Indian economy.

During the XI Five Year Plan, six new IIMs have been set up at Rohtak (Haryana), Raipur (Chhattisgarh), Ranchi (Jharkhand), Tiruchirappalli (Tamil Nadu), Kashipur (Uttarakhand) and Udaipur (Rajasthan).

IIMs conduct Post-graduate Diploma Programmes in Management, fellowship Programmes in Management, Short-term Management Development and Organization based programmes as well as carry out Research and Consultancy for the industry.

Indian Institutes of Science Education and Research (IISERs)

The Scientific Advisory Council to the Prime Minister (SAC-PM) under the Chairmanship of Prof. C.N.R. Rao, recommended creation of five new institutions devoted to science education and research to be named "Indian Institutes of Science Education and Research" broadly on the lines of IISc. Bangalore. Five such Institutes have already been established at Kolkata, Pune, Mohali, Bhopal and Thiruvananthapuram.

National Institutes of Technology (NITs)

On the recommendations of Engineering Personnel Committee (EPC) set up by the Planning Commission in 1955, eight Regional Engineering Colleges (RECs) (two in each regions - east, west, north & south) were set up in early sixties as joint and co-operative ventures of the Central and State Governments concerned with a view to provide the required technical manpower for the industrial projects being contemplated during the 2nd Five-Year Plan (1956-61). These institutes were registered as autonomous bodies under the Society Registration Act 1860 and affiliated to the State Universities in their respective regions.

Indian Institutes of Infomation Technology (IIITs)

The Central Government has established four IIITs at Allahabad, Gwalior, Jabalpur and Kanchipuram. These institutions are meant provide undergraduate as well as postgraduate education.

National Institutes of Technical Teachers' Training and Research (NITTTRs)

Four National Institutes of Technical Teachers' Training and Research (NITTTRs) located at Bhopal, Chandigarh, Chennai and Kolkata were established in mid 1960s for training of polytechnic teachers to undertake activities in the areas of Education, Planning & Management, Curriculum Development for implementation and Research etc. for overall improvement of polytechnic education. The Institutes offer long term training programmes of 12/18 months duration to degree and diploma level teachers of Polytechnic in addition to providing short term training courses, designing of curriculum and providing consultancy services to the industry.

SKILL-BASED EDUCATION

Skills and knowledge are the driving forces of economic growth and social development for any country. Presently, the country faces a demand – supply mismatch, as the economy needs more 'skilled' workforce than that is available. In the higher education sphere, knowledge and skills are required for diverse forms of employment in the sector of education, health care manufacturing and other services.

Curricula and Credit System for Skill Based Courses

In order to make education more relevant and to create 'industry fit' skilled workforce, the institutions recognized under Community Colleges, B.Voc Degree programme and Deen Dayal Upadhyay KAUSHAL Kendras offering skill based courses will have to be in constant dialogue with the industry and respective Sector Skill Council(s) so that they remain updated on the requirements of the workforce for the local economy.

Skill Based Vocational Courses Under NSQF

The three scheme variants for Skill Based Vocation Courses under NSQF are namely

1. Community College (CC)
2. B.Voc. Degree Programme and
3. Deen Dayal Kaushal Kendra (DDKK).

EXERCISE

1. Match List I with List II and choose the correct answer using the codes given below : **[December-2004]**

List I (Distinguished Ladies)	List II (Area of work)
A. Jhumpa Lahiri	(i) Journalist
B. Barkha Dutt	(ii) Novel Writing
C. Aparna Sen	(iii) Film Actress
D. Smita Patil	(iv) Film Director

Codes :

	A	B	C	D
(a)	(iv)	(iii)	(ii)	(i)
(b)	(ii)	(i)	(iv)	(iii)
(c)	(iv)	(i)	(iii)	(ii)
(d)	(ii)	(iii)	(iv)	(i)

2. Which of the following supports the process of scientific development? **[June-2005]**

(a) Realistic education (b) Ideal education
(c) Natural education (d) None of the choices

3. Foundation training to the newly recruited IAS (Probationers) is imparted by: **[December-2006]**

(a) Indian Institute of Public Administration
(b) Administrative Staff College of India
(c) L.B.S. National Academy of Administration
(d) Centre for Advanced Studies

4. The University which telecasts interactive educational programmes through its own channel is: **[June-2007]**

(a) B. R. Ambedkar Open University, Hyderabad
(b) I.G.N.O.U.
(c) University of Pune
(d) Annamalai University

5. The aim of vocationalization of education is: **[December-2007]**

(a) preparing students for a vocation along with knowledge
(b) converting liberal education into vocational education
(c) giving more importance to vocational than general education
(d) making liberal education job-oriented

6. Use of radio for higher education is based on the presumption of: **[December-2007]**

(a) Enriching curriculum based instruction
(b) Replacing teacher in the long run
(c) Everybody having access to a radio set
(d) Other means of instruction getting outdated

7. Match List-I with List-II and select the correct answer using the codes given below: **[December-2008]**

List-I (Artists)	List - II (Art)
A. Amrita Shergill	(i) Flute
B. T. Swaminathan Pillai	(ii) Classical Song
C. Bhimsenjoshi	(iii) Painting
D. Padma Subramaniyam	(iv) Bharat Natyam

Codes:

	A	B	C	D
(a)	(iii)	(i)	(ii)	(iv)
(b)	(ii)	(iii)	(i)	(iv)
(c)	(iv)	(ii)	(iii)	(i)
(d)	(i)	(iv)	(ii)	(iii)

8. Match List-I with List-II and select the correct answer using the codes given below : **[June-2009]**

List-I (Artists)	List-II (Art)
A. Pandit Jasraj	(i) Hindustani vocalist
B. Kishan Maharaj	(ii) Sitar
C. Ravi Shankar	(iii) Tabla
D. Udai Shankar	(iv) Dance

Codes :

	A	B	C	D
(a)	(i)	(ii)	(iii)	(iv)
(b)	(i)	(iii)	(iv)	(ii)
(c)	(i)	(iii)	(ii)	(iv)
(d)	(iii)	(ii)	(i)	(iv)

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9. Who has signed an MOU for Accreditation of Teacher Education Institutions in India? **[December-2009]**
(a) NAAC and UGC (b) NCTE and NAAC
(c) UGC and NCTE (d) NCTE and IGNOU

10. Which of the following organizations looks after the quality of Technical and Management education in India ? **[June-2011]**
(a) NCTE (b) MCI
(c) AICTE (d) CSIR

11. Indian Institute of Advanced Study is located at **[June-2012]**
(a) Dharmshala (b) Shimla
(c) Solan (d) Chandigarh

12. MC National University of Journalism and Communication is located at **[June-2012]**
(a) Lucknow (b) Bhopal
(c) Chennai (d) Mumbai

13. The Dada Saheb Phalke Award for 2013 has been conferred on **[June-2014]**
(a) Karan Johar (b) Amir Khan
(c) Asha Bhonsle (d) Gulzar

14. Which of the following universities has received the Visitor's Award for the best Central University in India in Feb. 2017 ? **[November-2017]**
(a) Jawaharlal Nehru University
(b) Banaras Hindu University
(c) Tezpur University
(d) University of Hyderabad

15. Which of the following has been ranked the best college in the country (2017) as per the **[November-2017]** National Institutional Ranking Framework (NIRF) ?
(a) Miranda House, Delhi
(b) St. Stephen's College, Delhi
(c) Fergusson College, Pune
(d) Maharaja's College, Mysore

16. GIAN (Global Initiative of Academic Networks) has been launched by Government of India in order to **[21st June 2019-Ist Shift]**
(a) Encourage Indian Scholars to learn abroad.
(b) Discourage Indian Scholars from researching in India.
(c) Encourage global scholars engage with their counter parts in India.
(d) Encourage global scholars to engage with Indian Scholars abroad.

17. Which one of the following institutions was established as a consequence to the closure of Inter-University Board brought in for promotion of cooperation among the Universities in the field of education and allied areas? **[21st June 2019-IInd Shift]**
(a) Association of Central Universities
(b) University Grants Commission
(c) IIAS, Shimla
(d) Association of Indian universities

18. Brain drain problem which was domination in the middle of 20th Century in India is indicative of which one of the following aspects? **[21st June 2019-Ist Shift]**
(i) Lack of adequate facilities for advanced study and research in India.
(ii) The capacity of the developed nations to buy the talent at a price beyond the means of the developing nation.
(iii) Increase of population and under utilization of human research.
Choose the correct option from below:
(a) Only (i) and (iii) (b) Only (ii) and (iii)
(c) Only (iii) (d) Only (i) and (ii)

19. Below are given two columns. Column – A presents the stream of courses and column – B presents the name of courses. Match the two columns. **[25th June 2019-IInd Shift]**

	Column A (Stream)		**Column B (Name of courses)**
(1)	Professional	(i)	Engineering Architecture
(2)	Academic	(ii)	Carpentering, Sewing
(3)	Technical	(iii)	Medicine, Law
(4)	Skill based	(iv)	Arts, Commerce

Choose your answer from the options given below:
(a) (1)–(iii); (2)–(ii); (3)–(i); (4)–(iv)
(b) (1)–(ii); (2)–(iii); (3)–(iv); (4)–(i)
(c) (1)–(i); (2)–(ii); (3)–(iii); (4)–(iv)
(d) (1)–(iii); (2)–(iv); (3)–(i); (4)–(ii)

20. Identify the scheme which aims to encourage Social Science Research in Policy relevant areas so as to provide vital inputs in policy formulation, implementation and evaluation **[26th June 2019-IInd Shift]**
(a) ICSSR Fellowship
(b) Congnitive Initiaives
(c) ICSSR – IMPRESS
(d) ICSSR Research Projects

21. Which one of the following instructional designs is not a part of SWAYAM launched by government of India? **[24th June 2019-Ist Shift]**
(a) E–tutorial (b) E–Content
(c) Physical interaction (d) Discussion forum

22. 'Inspire scholarship' is intended by the funding agency _____. **[25th June 2019-Ist Shift]**
(a) Indian Council of Social Science and Research (ICSSR)
(b) University Grants Commission (UGC)
(c) Department of Science and Technology (DST)
(d) National Council of Education, Research and Training (NCERT)

23. Which one of the following sequences correctly reflects the evolution of educational technology support in higher education? **[2nd Dec. 2019-IInd Shift]**

(a) Programmed learning material, text book support, online and modular material
(b) Text book supplementation, programmed learning material, modular material and online methods
(c) Modular material, programmed learning, online and text book supplementation
(d) Online methods, modular material, text-book supplementation and programmed learning material

24. Which one of the following has been the basis for introduction of yoga in teacher training courses? **[2nd Dec. 2019-Ist Shift]**

(a) National Policy of Education — 1968
(b) National Policy on Education — 1986
(c) Vision of Teacher Education in India I Quality and Regulatory Perspective — 2012
(d) Draft National Education Policy — 2019

25. Match the following national co-ordinators of SWAYAM (List 1) with their distinguishing Programmes (List II) **[5th Dec. 2019-IInd Shift]**

List I (Basis)	**List II (Description)**
(A) NPIEL	(i) School education
(B) CEC	(ii) Engineering programme
(C) NCERT and NIOS	(iii) Teacher training programme
(D) NITTR	(iv) Under-graduate education

Choose the correct option from those given below:
(a) (A)-(iii), (B)-(ii), (C)-(iv), (D)-(i)
(b) (A)-(ii), (B)-(iv), (C)-(i)- (D)-(iii)
(c) (A)-(i), (B)-(iii), (C)-(ii), (D)-(iv)
(d) (A)-(iv), (B)-(i), (C)-(iii), (D)-(ii)

26. Match List I with List II: **[2nd Dec. 2019-Ist Shift]**

List I (E—initiatives)	**List ll (Descriptions)**
(A) Vidwan	(i) Repository for full-text thesis. e-books and journals
(B) Digilocker	(ii) Education portal to facilitate learning
(C) Sakshat	(iii) Database of leading scientists/ Researchers
(D) Shodh Ganga	(iv) Platform for issuance and verification of documents and certificates

Choose the correct answer from the options given below :
(a) (A)-(i), (B)-(iii),(C)-(iv),(D)-(ii)
(b) (A)-(iii), (B)-(iv),(C)-(ii),(D)-(i)
(c) (A)-(iv), (B)-(ii),(C)-(i),(D)-(iii)
(d) (A)-(ii), (B)-(i),(C)-(iii),(D)-(iv)

27. Which of the following statements is/are correct in the context of 'Digital India' Initiative of Government of India? **[5th Dec. 2019-Ist Shift]**

(A) National Digital Library of India (NDL India) is a 24 × 7 online store house of all academic awards duly digitized and lodged by academic institutions.
(B) National Academic Depository (NAD) is an all - digital library that stores information (metadata) about different types of digital content relevant to the citizens.

Choose the correct option:
(a) (A) only (b) (B) only
(c) Both (A) and (B) (d) Neither (A) not (B)

28. With regard to "Digilocker", which of the following statements are correct? **[5th Dec. 2019-IInd Shift]**

(A) It is a digital locker system offered by the Government under Digital India Programme
(B) It provides financial and technical assistance to young start-up entrepreneurs
(C) It allows users to access their e-documents irrespective of physical location

Choose the correct option:
(a) (A) and (B) only (b) (A) and (C) only
(c) (B) and (C) only (d) (A), (B) and (C)

29. Which among the following is the agship scheme of the Ministry of Skill Development and Entrepreneurship implemented by National Skills Development Corporation? **[6th Dec. 2019-Ist Shift]**

(a) Robotic India
(b) Articial Intelligence @ schools
(c) Make in India
(d) Pradhan Mantri Kaushal Vikas Yojna

30. Given below are two statements - one is labelled as Assertion (A) and the other is labelled as Reason (R) **[4th Dec. 2019-IInd Shift]**

Assertion **(A):** Skill development is a key feature in every individual's life.

Reason **(R):** An individual who wants to get employed, needs to possess good education only.

In the context of above two statements. Choose the correct option:
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(c) (A) is true, but (R) is false
(d) (A) is false, but (R) is true

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HINTS & EXPLANATION

1. (b) Jhumpa Lahiri is an American author of Indian origin, known for her short-stories, novels and essays in English. Barkha Dutt is an Indian television journalist and author. Aparna Sen is an Indian filmmaker and actress who is known for her work in Bengali cinema. Smita Patil was an Indian actress.

2. (a) **Naturalism** propounds that neither the mind nor the spirit, rather, Nature with all its constituent matter, is the ultimate reality; for the world is governed by the laws of Nature, and man, himself a creation of Nature, must submit to them. Naturalism in education stands for the doctrine of "follow nature" where the whole of the child's learning will come from his own experiences governed by the natural laws of human development.

Realism takes after Aristotle's philosophy that there exists a true reality whether humans perceive them or not. Realistic education emphasises logic, critical thinking and scientific method of perceiving reality.

Idealism

Idealism takes after Plato's philosophy of duality of mind and body or the existence of two worlds— the spiritual or mental world, which is eternal, permanent, orderly, regular, and universal; and, the sensory world (experienced through the five human senses of sight, touch, smell, taste, and sound) that is transient, changing, imperfect and disorderly. Idealistic education focuses on bringing to consciousness the ideas which are latent in the mind by discovering and developing each student's abilities as well as moral values for the ultimate good of the society.

3. (c) L.B.S. National Academy of Administration's main purpose is to train civil service officers of Indian Administrative Service, Indian Police Service, Indian Forest Service; and also for Group-A Central Services such as Indian Foreign Service among others.

4. (b) The Indira Gandhi National Open University (IGNOU) launched its educational broadcast channel Gyan Darshan. It was launched through webcasting along with its Electronic Media Production Centre (EMPC) page on Facebook.

5. (d) Vocational education prepares/skills/trains students for specific jobs. As per the Ministry of HRD, 'The Centrally Sponsored Scheme of Vocationalisation of Secondary Education provides for diversification of educational opportunities so as to enhance individual employability, reduce the mismatch between demand and supply of skilled manpower and provides an alternative for those pursuing higher education.'

6. (c) Use of radio for higher education is based on the presumption of everybody having access to a radio set.

7. (a) Amrita Shergill – Painting
T. Swaminathan Pillai – Flute
Bhimsenjoshi – Classical Song
Padma Subramaniyam – Bharat Natyam

8. (c) Pandit Jasraj – Hindustani vocalist
Kishan Maharaj – Tabla
Ravi Shankar – Sitar
Udai Shankar – Dance

9. (b) NCTE – National Council of Teacher Education; and, NAAC – National Accreditation and Assessment Council signed an MOU for Accreditation of Teacher Education Institutions in India.
'As approved by the Executive Committee (EC), the NAAC-NCTE MoU stands terminated and Assessment and Accreditation (A&A) of Teacher Education Institutions (TEIs) by NAAC is discontinued forthwith.' (NAAC, Bengaluru, release on 16/05/2018)

10. (c) All India Council for Technical Education (AICTE) was established in 1945 by Government of India. The organization was set up as an Apex Advisory Body to conduct survey on facilities on technical education and to promote and develop technical education in the country.

11. (b) The Indian Institute of Advanced Study is located in Shimla. It was set up by the Ministry of Education, Government of India in 1964 and it started functioning from 20 October 1965.

12. (b) Makhanlal Chaturvedi National University of Journalism and Communication (MCNUJC), also known as Makhanlal University is a public university in Bhopal, Madhya Pradesh.

13. (d) The Dada Saheb Phalke Award for 2013 has been conferred on Gulzar.

14. (a) Jawaharlal Nehru University has received the Visitor's Award for the best Central University in India in February 2017.

15. (a) As per the National Institutional Ranking Framework (NIRF) 2017, Miranda House, Delhi has been ranked as the top college in India. Six colleges among the top ten were of Delhi University. The institution that came in the second position is Loyola College in Chennai.

16. (c) Union Ministry of Human Resource Development (HRD) has launched Global Initiative of Academic Networks (GIAN) Scheme to boost the quality of higher education in India. It was launched in order to increase the footfalls of reputed international faculty in the Indian academic institutes and to provide opportunity to our students to seek knowledge and experience from reputed International faculty.

17. (d) On September 29, 1967, the Inter-University Board was renamed as Association of Indian Universities (AIU) in 1973. Since its inception AIU is actively engaged in the growth and development of Higher Education. The membership of AIU includes all types of universities such as Conventional Universities, Open Universities, and Deemed to be Universities, State Universities, Central Universities, Private Universities and Institutes of National Importance.

In addition to Indian Universities, 13 Universities/ Institutes from Bangladesh, Bhutan, Republic of Kazakhstan, Malyasia, Mauritius, Nepal, Thailand, United Arab Emirates and United Kingdom are its Associate Members.

18. (d) Brain drain problem are the indicative of the lack of adequate facilities for advance studies and research in India and the capacity of the developed nations to buy the talent at a price beyond the means of the developing nations.

19 (d)

20. (c) Impactful Policy Research in Social Science (IMPRESS) by Indian Council of Social Science Research, MHRD, is an idea of its own kind that aims to provide a research roadmap to address policy challenges pertaining to society and so, social science areas

21. (c) SWAYAM is a programme initiated by Government of India and designed to achieve the three cardinal principles of Education Policy viz., access, equity and quality. The courses hosted on SWAYAM are in 4 quadrants – (1) video lecture, (2) specially prepared reading material that can be downloaded/printed (3) self-assessment tests through tests and quizzes and (4) an online discussion forum for clearing the doubts. Steps have been taken to enrich the learning experience by using audio-video and multi-media and state of the art pedagogy / technology.

22. (c) The Department of Science and Technology (DST), Government of India gives Scholarships for Higher Education (SHE), called INSPIRE-SHE Scholarships, to the students enrolled in undergraduate programs in natural and basic sciences all across the country in order to inspire them to become leading scientists. Inspire Scholarship has been started from the year 2008 with 1979.25 crores. The main goal of this scholarship is to deliver the talent of science and youth of the country.

23. (b) Education technology support started with text book supplementation to which programmed learning material was added and soon modular material was made available. Eventually, online methods became more and more useful and popular.

24. (b) In the National Policy on Education-1986 efforts were made to establish sports institutions and hostels. Encouragement was also given to the talented sports and games persons. In this very policy the efforts was also made to introduce Yoga in all schools and teacher training courses and indigenous traditional games were emphasized.

25. (b) National program on technology and enhanced learning or *NPTEL* is an initiative by IITs of India to provide best education materials (engg. ,science & humanities mainly) online . The Consortium for Educational Communication (*CEC*) is one of the Inter University Centres set up by the University Grants Commission of India. The National Council of Educational Research and Training (NCERT) is an autonomous organisation set up in 1961 by the Government of India for qualitative improvement in school education. The National Institute of Open Schooling (NIOS) is an autonomous Institution under MHRD established in 1989. NIOS offers Secondary (10th), Sr.Secondary (12th) and Vocational courses through open and distance learning (ODL) mode. NITTTR Chennai also serves as one of the National Coordinator for SWAYAM for the teacher training program.

26. (b) VIDWAN is the premier database of profiles of scientists / researchers and other faculty members working at leading academic institutions.

DigiLocker is the national Digital Locker System launched by Govt. of India. It is a secure cloud based platform for storage, sharing and verification of documents & certificates.

SAKSHAT is one stop Education Portal was launched on October 30, 2006 to facilitate lifelong learning for students, teachers and those in employment or in pursuit of knowledge free of cost to them.

Shodhganga is the name coined to denote digital repository of Indian Electronic Theses and Dissertations set-up by the INFLIBNET Centre.

27. (d) MHRD under its National Mission on Education through Information and Communication Technology has initiated the National Digital Library (NDL) project to develop a framework of virtual repository of learning resources with a single-window search facility. It is being developed at IIT Kharagpur. NDL has been designed to benefit all kinds of users like students (of all levels), teachers, researchers, librarians, library users, professionals, differently abled users and all other lifelong learners. Educational materials are available for users ranging from primary to post-graduate levels are available on this portal.

"National Academic Depository (NAD)" is a National System set-up by Ministry of Human Resources Development and University Grants Commission to facilitate Academic Institutions to Digitally, Securely and Quickly issue Online Academic Awards to the Students directly in their online NAD Account.

28. (b) **DigiLocker** is a flagship initiative of Ministry of Electronics & IT under Digital India programme. It aims at 'Digital Empowerment' of citizen by providing access to authentic digital documents to citizen's **digital document wallet. It** does not provide financial and technical assistance to young start-up entrepreneurs. The issued documents in DigiLocker system are deemed to be at par with original physical documents as per Rule 9A of the Information Technology (Preservation and Retention of Information by Intermediaries providing Digital Locker facilities) Rules, 2016 notified on February 8, 2017 vide G.S.R. 711(E).

29. (d) Pradhan Mantri Kaushal Vikas Yojana (PMKVY) is the flagship scheme of the Ministry of Skill Development & Entrepreneurship (MSDE) implemented by National Skill Development Corporation. The objective of this Skill Certification Scheme is to enable a large number of Indian youth to take up industry-relevant skill training that will help them in securing a better livelihood.

30. (c) If Assertion (A) states that skill development is a key feature in an individual's life, the reason cannot be that only good education is needed for getting employed. Employers seek life skills and other specialised skills in their candidates.

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CHAPTER 48

Value Education and Environmental Education

VALUE-EDUCATION

Value Education is a process or function of education that helps in the development of an individual personality of humans. It's a process by which people give moral values to each other. In other words, it is the aggregate of all such actions by means of which people develop the attitudes, abilities and other forms of behavior of the positive values in the society in which they live".

OBJECTIVES OF VALUE EDUCATION

- To improve the integral growth of people.
- Improvement in the sustainable lifestyle of the human being.
- To increase awareness about our nation like the history of the country, constitutional rights, national integration etc.
- Developing a democratic way to improve the level of thinking.
- To develop the tolerance and understanding capacity of different religious faiths.

ENVIRONMENTAL EDUCATION

Environmental education or environmental literacy is something that every person should be well versed with. The principles of ecology and fundamentals of environment can really help create a sense of earth-citizenship and a sense of duty to care for the earth and its resources and to manage them in a sustainable way so that our children and grand children to inherit a safe and clean planet to live on.

OBJECTIVES/AIMS OF ENVIRONMENTAL EDUCATION

- **Knowledge f**or the basic understanding of the environment and its various challenges.
- **Awareness** for the awareness and sensitivity to the environment and environmental challenges.
- **Attitude** to collect the values and feelings in regard to environment and for participating in improvement and protection activities of the environment.
- **Participation** for the resolution of various environmental problems, encouraging the citizens to take involvement in the benefit of the environment.

Provisions for Environmental education

- Environmental Education was made compulsory at all level of Indian Education system by the Honorable Supreme Court in 1991.
- **Article 48-A:** the responsibility of every citizen in the form of fundamental duty has been laid down.
- **Constitution of India:** The State shall endeavor to protect and improve the environment and to safeguard the forests and wildlife of the country".
- **National Policy on Education in 1986:** There is a paramount need to create a consciousness of the environment

Characteristics of Environmental Education

It concerns the interrelationship between human and natural system. The objective of Environmental Education has been modified to Environmental Education for Sustainable development (EESD) which has a broader implication for poverty, population, development and gender. It can be useful for the development of students' skills to deal with current situations of the local and global environment. Environmental Education encourages the school-communities for the development of environment-related programs besides of formal education.

ENVIRONMENTAL EDUCATION FOR SUSTAINABLE DEVELOPMENT

Environmental education has been placed at the center of efforts to achieve sustainabel development for the last several decades. International gagreements suchas Agenda 21, for example, have called for a re-orientation of all education towards sustainability (UNCEC, 1992 Chapter 36).

India adopted a new paradigm of thinking and experience of development post-Stockholm Conference of 1972 called Sustainable Development (SD), Following which, India became a part of 187 countries agreeing on carrying out an important commitment towards SD by signing the Rio Declaration furing 1992 UN Conference on Environment and Development.

In order to achieve the goals of sustainable development, one of the first steps taken was in the direction of environment conservation and protection by promoting Environment education. This strategy was adopted post Stockholm conference by setting up centers of Excellence for Environment Education under Ministry of Environment in the early 1980s

EXERCISE

1. Rovers Cup is associated with **[June-2005]**
(a) Tennis (b) Football
(c) Volleyball (d) Basket ball

2. Which of the following sports activities was organized in India in 1982? **[June-2005]**
(a) Olympic Games
(b) Common Wealth Games
(c) Asian Games
(d) None of the choices

3. Value education makes a student: **[June-2007]**
(a) Good citizen (b) Successful businessman
(c) Popular teacher (d) Efficient manager

4. Value-education stands for: **[December-2008]**
(a) making a student healthy
(b) making a student to get a job
(c) inculcation of virtues
(d) all-round development of personality

5. Most of the Universities in India **[December-2010]**
(a) conduct teaching and research only
(b) affiliate colleges and conduct examinations
(c) conduct teaching/research and examinations
(d) promote research only

6. Moral values can be effectively inculcated among the students when the teacher **[June-2011]**
(a) frequently talks about values
(b) himself practices them
(c) tells stories of great persons
(d) talks of Gods and Goddesses

7. The aim of value education to inculcate in students is **[December-2011]**
(a) the moral values (b) the social values
(c) the political values (d) the economic values

8. Indicate the number of Regional Offices of National Council of Teacher Education. **[June-2012]**
(a) 04 (b) 05
(c) 06 (d) 08

9. As part of National Climate Change Policy, Indian government is planning to raise the installed capacity of renewable energy by the year 2030 to : **[December-2015]**
(a) 175 GW (b) 200 GW
(c) 250 GW (d) 350 GW

10. Which of the following core values among the institutions of higher education are promoted by the NAAC (National Assessment and Accreditation Council)? **[July-2016]**
(A) Contributing to national development.
(B) Fostering global competencies among the students:
(C) Inculcating a value system among students and teachers.
(D) Promoting the optimum utilization of the infrastructure.
Select the correct answer from the codes given below :
Codes :
(a) (B), (C) and (D) (b) (A), (B) and (C)
(c) (A), (C) and (D) (d), (B), (C) and (D)

11. The best way for providing value education is through **[July-2016]**
(a) discussions on scriptural texts
(b) lectures / discourses on values
(c) seminars / symposia on values
(d) mentoring / reflective sessions on values

12. The purpose of value education is best served by focussing on **[January-2017]**
(a) Cultural practices prevailing in the society.
(b) Norms of conduct laid down by a social group.
(c) Concern for human values.
(d) Religious and moral practices and instructions.

13. Which of the following indicate the pillars of learning contained in the UNESCO Report, 1996, "Learning the Treasure Within". **[25th June 2019-IInd Shift]**
(1) Learning to know
(2) Learning to be
(3) Learning to learn
(4) Learning to understand
(5) Learning to live together
Choose your answer from the options given below:
(a) (1), (2), (3) and (4) (b) (1), (3), (4) and (5)
(c) (2), (3), (4) and (5) (d) (1), (2), (3) and (5)

14. Identify values specially related to organizational ethos from the list given below : **[3rd Dec. 2019-Ist Shift]**
(i) Team work in the approach
(ii) Productivity of the tasks
(iii) Changes in the global contents
(iv) Financial security
(v) Humility in dealing with others concerns
(vi) Technological resources
Choose your answer from the following options :
(a) (i), (iii) and (vi) (b) (iii), (iv) and (v)
(c) (ii), (iii) and (iv) (d) (i), (ii) and (v)

15. Identify the form of education having high potential for providing optimism, self-esteem and commitment to personal fulfillment, ethical judgement and social responsibility from the following : **[5th Dec. 2019-IInd Shift]**
(a) Formal education (b) Technical education
(c) Moral education (d) Value education

16. The National Skills Qualifications Framework is based on which of the following? **[6th Dec. 2019-IInd Shift]**
(a) Competency
(b) Technology
(c) Economic development
(d) Evaluation

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HINTS & EXPLANATION

1. (b) The Rovers Cup was a football tournament held in India. It was started by British football enthusiasts at Bombay in 1891.

2. (c) India was the host nation for the 1982 Asian Games held at Delhi, India from November 19 to December 4, 1982.

3. (a) Education has very good role to make a good citizen. Value education makes a student a good citizen.

4. (c) Value education is the process by which moral values are inculcated in learners through methods or programmes that teachers or educators use to create learning experiences that establish the efficacy of morals/ethics/ values in making the ultimate good prevail in human society.

5. (c) Most of the Universities in India conduct teaching, research and examinations.

6. (b) 'Action speaks louder than words', and 'one must practice what one preaches' to be taken seriously. It is an established fact that children follow/ emulate their elders' actions rather than words. So, teachers must practice moral values themselves if they want to inculcate those in their students.

7. (a) The aim of value education to inculcate in students is the moral values. A school is a place where children spent most of the time and they get to learn many positive values in life.

8. (a) Four official 'Regional Committees' of NCTE operate from Jaipur, Bangalore, Bhubaneswar and Bhopal handling the Northern, Southern, Eastern and Western regions respectively. The NCTE has its headquarters in New Delhi.

9. (d) The Indian government may soon announce a target to have 40% power generation capacity based on renewable energy technologies by 2030. This would translate to around 350 GW by 2030, pushing the country's expected total capacity to 850 GW power generation capacity.

10. (b) The National Assessment And Accreditation Council (NAAC) is an autonomous body established by the University Grants Commission (UGC) of India to assess and accredit institutions of higher education in the country. To address the issues of quality, the National Policy on Education (1986) and the Plan of Action (POA-1992) advocated the establishment of an independent national accreditation body. As a result, the NAAC was established in 1994 with its headquarters at Bangalore.

11. (d) With reflective practice, learners find relevancy and meaning in a lesson and make connections between educational experiences and real life situations. It increases insight, and creates pathways to future learning.

12. (c) In value education, all round development of human is considered, whereas in moral education only ideals of individuals with its relation to society are considered.

13. (d) As per the report of UNESCO, 1996, Education throughout life is based on four pillars: learning to know, learning to do, learning to live together and learning to be.

14. (d) Every organisation, academic, business or any other, has a set of values at the core of desired behaviour expected from everyone from the top-level executive to the employees. Violating ethical conduct risks public relations nightmares which might include discrimination, fraud and indecency. So, team work, aiming for productivity of the tasks, and humility in dealing with other organisations are the basic values related to organisational ethos.

15. (d) Formal education is knowledge-based and information-oriented which takes care of only the intellectual development of the learner. Technical education trains the learner in technical skills. Moral education lays emphasis in ingraining morals in the learner. Consequently, the other aspects of their personality are not properly developed for the growth of right attitudes, habits, values, skills and interests in them.

"Value-education is the aggregate of all the process by means of which a person develops abilities, attitudes and other forms of behaviour of the positive values in the society in which he lives." (C. V. Good) . So, value education has high potential for providing optimism, self-esteem and commitment to personal fulfilment, ethical judgement and social responsibility.

16. (a) The National Skills Qualifications Framework (NSQF) is a competency-based framework that organizes all qualifications according to a series of levels of knowledge, skills and aptitude. These levels, graded from one to ten, are defined in terms of learning outcomes which the learner must possess regardless of whether they are obtained through formal, non-formal or informal learning.

CHAPTER 49

Policies, Governance and Administration

From time immemorial, India has excelled as a centre of learning. Ancient universities of repute, like the Nalanda, Takshashila, Vikramshila and Vallabhi attracted scholars from different corners of the world.

The period since 1986 till 2015 The National Policy on Higher Education (1986) translated the vision of Radhakrishnan Commission and Kothari Commission in five main goals for higher education, which include Greater Access, Equal Access (or Equity), Quality and Excellence, Relevance and Value Based Education.

The Action Plan of 1992 included schemes and programs which were directed towards expansion of intake capacity in general, and that of the disadvantaged groups such as the poor, SC, ST, minorities, girls, the physically challenged persons, and those in the educationally backward regions, in particular. The Schemes/ Programmes were designed to improve the quality through strengthening academic and physical infrastructure, to promote excellence in those institutions which have exhibited potential for excellence, and to develop curriculum to inculcate right values among the youth. However from 1986 onwards, the GOI emphasized more on elementary education than higher education, thus marking the beginning of a long period of two-and–a half decades of neglect of higher education. Despite the weakening of public expenditure on higher education, growth continued through the emergence of private institutions. The neoliberal policies of the 1990s have accelerated it.

Five-Year Plans and Education during 1986-2014

Five-Year Plan (FYP)	Major strides in the area of higher education
Seventh FYP (1985-90)	• Indira Gandhi National Open University (IGNOU) was established.
Eighth FYP (1992-97)	• After a period (1989-91) of political instability, this plan highlighted several weaknesses such as substandard institutions, outdated curriculum, and lack of research. • Focus on integrated and cost-efficient higher education without compromising excellence and equity. • An information and library network "INFLIBNET" was proposed.
Ninth FYP (1997-2002)	• Focused on the deterioration of quality, the resource crunch and the problems of governance in higher education. • Target to grant autonomous status to 10% of eligible colleges.
Tenth FYP (2002-2007)	• Target to raise the enrolment in higher education of the 18-23 year age group from the present 6 % to 10 % by the end of the Plan period through strategies of increasing access, quality, adoption of state-specific strategies and the liberalization of the higher education system. • Emphasis on relevance of the curriculum, vocationalization, and networking on the use of information technology.
Eleventh FYP (2007-2012)	• Improve quality by working on detailed reforms agenda including: (a) admission, curriculum and assessment; (b) Accreditation & ratings; (c) teachers competence and motivation; and (d) Restructure affiliated colleges and research for policy formulation. • Establish 30 new Central Universities, 16 in States where they do not exist and 14 as World Class Universities, 8 new IITs, 7 new IIMs, 10 new NITs, 3 IISERs (Indian Institutes of Science, Education and Research), 20 IIITs and 2 new SPAs (School of Planning and Architecture)
Twelfth FYP (2012-2014) Planning Commission has been abolished in 2014 to usher in the NITI AAYOG	• Plans for inclusive expansion brought in under the RUSA (Rashtriya Uchchatar Shiksha Abhiyan) which would include up gradation of autonomous and rated colleges into universities, increasing the intake capacity of existing higher education institutions, encouraging existing universities to start undergraduate programmers or integrated UG-PG programme; and creation of small, affiliating College Cluster Universities at the regional level. • Other step would be to promote equal access to quality.

Recent Major Initiatives in Higher Education

After the abolition of the Planning commission with the coming of the new Government in 2014, the Ministry of Human Resource and Development (MHRD) has taken some path-breaking initiatives in the field of higher education. The GOI appointed a five-member committee under the chairmanship of T.S.R. Subramanian to evolve a draft NEP, and it submitted its report in May, 2016. The main areas of intervention of the draft policy are:

i. Access and participation,
ii. Quality of education,
iii. Curriculum and examination reforms,
iv. Teacher development and management and
v. Skill development and employability.

EXERCISE

1. Which of the following factors is/are responsible for the increase of the role of Government in Developing Countries? **[December-2004]**
(A) Economic Planning
(B) Rising expectation of People
(C) Privatisation
(D) Emergence of the concept of Welfare State
Select the most appropriate answer from the code given below:
Codes :
(a) (A) and (D) (b) (A), (B) and (D)
(c) Only (C) (d) Only (D)

2. In India, a political party is recognised as a National or Regional Party by the : **[December-2004]**
(a) President of India
(b) Election Commission of India
(c) Law ministry in consultation with the Law Commission of India
(d) Union Parliament in consultation with the State Legislatures

3. The Idea of 'Democratic Decentralisation' in India was popularised by : **[December-2004]**
(a) A.D. Gorwala Committee, 1951
(b) Paul H. Appleby Committee, 1953
(c) B.R. Mehta Committee, 1957
(d) Ashok Mehta Committee, 1978

4. Another name of Basic Education or Nai Talim is : **[December-2004]**
(a) Compulsory Education (b) New Education Policy
(c) Wardha Education Plan (d) Sarva Shikshya Abhiyan

5. Which of the following fields has been given major stress in the national education policy? **[June-2005]**
(a) Examination and evaluation
(b) Professionalisation
(c) Research
(d) Instruction

6. In the voting system in Presidential election, votes of the different states of the Indian Union are **[June-2005]**
(a) Equally important
(b) Different
(c) More important in the case of larger states
(d) Less important in the case of smaller states

7. The minimum age limit for a person be elected as the president of India is **[June-2005]**
(a) 30 years (b) 25 years
(c) 35 years (d) 40 years

8. System adopted for the election of the President of India is **[June-2005]**
(a) Multi Transferable vote system
(b) Single Transferable vote system
(c) Single vote system
(d) None of the choices

9. The president of India is elected by: **[June-2005]**
(a) An Indirect election
(b) A direct election
(c) Both by indirect and direct election
(d) None of the choices

10. The president of India is elected by an electoral college which consist of: **[June-2005]**
(a) Member of the Lok Sabha
(b) Member of the Rajya Sabha
(c) All members of the both houses of Parliament
(d) Elected members of both houses of parliament and the legislative Assemblies of the states

11. The Lok - Sabha can be dissolved before the expiry of its normal five year term by **[December-2005]**
(a) The Prime Minister
(b) The Speaker of Lok Sabha
(c) The President on the recommendation of the Prime Minister
(d) None of the above

12. Which of the following is not a Fundamental Right ? **[December-2005]**
(a) Right to equality
(b) Right against exploitation
(c) Right to freedom of speech and expression
(d) Right of free compulsory education of all children upto the age of 14

13. Parliament can legislate on matters listed in the State list: **[June-2006]**
(a) With the prior permission of the President.
(b) Only after the constitution is amended suitably.
(c) In case of inconsistency among State legislatures.
(d) At the request of two or more States.

14. 'SITE' stands for: **[June-2006]**
(a) System for International technology and Engineering
(b) Satellite Instructional Television Experiment
(c) South Indian Trade Estate
(d) State Institute of Technology and Engineering

15. Which is the smallest North-east State in India? **[June-2006]**
(a) Tripura (b) Meghalaya
(c) Mizoram (d) Manipur

16. Who among the following can be asked to make a statement in Indian Parliament? **[June-2006]**
(a) Any MLA
(b) Chief of Army Staff
(c) Solicitor General of India
(d) Mayor of Delhi

17. Electoral disputes arising out of Presidential and Vice-Presidential Elections are settled by: **[December-2006]**
(a) Election Commission of India
(b) Joint Committee of Parliament
(c) Supreme Court of India
(d) Central Election Tribunal

18. Match List - I (Institutions) with List - II (Functions) and select the correct answer by using the code given below: **[December-2006]**

List - I (Institutions)	List - II (Functions)
A. Parliament	(i) Formulation of Budget
B. C & A.G.	(ii) Enactment of Budget
C. Ministry of Finance	(iii) Implementation of Budget
D. Executing Departments	(iv) Legality of expenditure
	(v) Justification of Income

Code:

	A	B	C	D
(a)	(iii)	(iv)	(ii)	(i)
(b)	(ii)	(iv)	(i)	(iii)
(c)	(v)	(iii)	(iv)	(ii)
(d)	(iv)	(ii)	(iii)	(v)

19. Which one of the following Articles of the Constitution of India safeguards the rights of Minorities to establish and run educational institutions of their own liking? **[December-2006]**
(a) Article 19 (b) Article 29
(c) Article 30 (d) Article 31

20. The right to impart and receive information is guaranteed in the Constitution of India by Article: **[December-2007]**
(a) 19 (2) (A) (b) 19(16)
(c) 19(2) (d) 19(1) (A)

21. The total number of members in the Press Council of India are: **[December-2007]**
(a) 28 (b) 14
(c) 17 (d) 20

22. Autonomy in higher education implies freedom in: **[June-2008]**
(a) Administration (b) Policy-making
(c) Finance (d) Curriculum development

23. NAAC is an autonomous institution under the aegis of: **[June-2008]**
(a) ICSSR (b) CSIR
(c) AICTE (d) UGC

24. Which opinion is not correct? **[December-2008]**
(a) Education is a subject of concurrent list of VII schedule of Constitution of India
(b) University Grants Commission is a statutory body
(c) Patent, inventions, design, copyright and trademarks are the subject of concurrent list
(d) Indian Council of Social Science Research is a statutory body related to research in social sciences

25. Election of Rural and Urban local bodies are conducted and ultimately supervised by: **[December-2008]**
(a) Election Commission of India
(b) State Election Commission
(c) District Collector and District Magistrate
(d) Concerned Returning Officer

26. Match List-I with List-II and select the correct answer from the code given below: **[December-2008]**

List-I (Institutions)
A. National Law Institute
B. Indian Institute of Advanced Studies
C. National Judicial Academy
D. National Savings Institute

List-II (Locations)
(i) Shimla (ii) Bhopal
(iii) Hyderabad (iv) Nagpur

Codes :

	A	B	C	D
(a)	(iii)	(ii)	(iv)	(i)
(b)	(i)	(ii)	(iii)	(iv)
(c)	(iv)	(iii)	(i)	(ii)
(d)	(iii)	(i)	(ii)	(iv)

27. Which is not correct in latest communication award? **[December-2008]**
(a) Salman Rushdie - Booker's Prize - July 20, 2008
(b) Dilip Sanghavi - Business Standard CEO Award July 22, 2008
(c) Tapan Sinha - Dada Saheb Falke Award, July 21, 2008
(d) Gautam Ghosh - Osians Lifetime Achievement Award July 11, 2008

28. Which one of the following is not the tool of good governance? **[June-2009]**
(a) Right to information (b) Citizens' Charter
(c) Social Auditing (d) Judicial Activism

29. Which article of the constitution provides safeguards to Naga Customary and their social practices against any act of Parliament? **[June-2009]**
(a) Article 371 A (b) Article 371 B
(c) Article 371 C (d) Article 263

30. Which part of the Constitution of India is known as "Code of Administrators"? **[June-2009]**
(a) Part I (b) Part II
(c) Part III (d) Part IV

31. Chandrayan I was launched on 22nd October, 2008 in India from: **[June-2009]**
(a) Bangalore (b) Sri Harikota
(c) Chennai (d) Ahmedabad

32. The Parliament in India is composed of **[December-2009]**
(a) Lok Sabha & Rajya Sabha
(b) Lok Sabha, Rajya Sabha & Vice President
(c) Lok Sabha, Rajya Sabha & President
(d) Lok Sabha, Rajya Sabha with their Secretariats

33. According to Article 120 of the Constitution of India, the business in Parliament shall be transacted in **[December-2009]**
(a) English only
(b) Hindi only
(c) English and Hindi both
(d) All the languages included in Eighth Schedule of the Constitution

34. The recommendation of National Knowledge Commission for the establishment of 1500 Universities is to **[December-2009]**
(a) create more teaching jobs
(b) ensure increase in student enrolment in higher education
(c) replace or substitute the privately managed higher education institutions by public institutions
(d) enable increased movement of students from rural areas to urban areas

35. Which of the following sources of data is not based on primary data collection ? **[December-2009]**
(a) Census of India
(b) National Sample Survey
(c) Statistical Abstracts of India
(d) National Family Health Survey

36. The Right to Information Act, 2005 makes the provision of **[June-2010]**
(a) Dissemination of all types of information by all Public authorities to any person.
(b) Establishment of Central, State and District Level Information Commissions as an appellate body.
(c) Transparency and accountability in Public authorities.
(d) All of the above

37. Deemed Universities declared by UGC under Section 3 of the UGC Act 1956, are not permitted to **[June-2010]**
(a) offer programmes in higher education and issue degrees.
(b) give affiliation to any institute of higher education.
(c) open off-campus and off-shore campus anywhere in the country and overseas respectively without the permission of the UGC.
(d) offer distance education programmes without the approval of the Distance Education Council.

38. Match List-I with List-II and select the correct answer from the codes given below : **[June-2010]**

List – I (Articles of the Constitution)	**List – II (Institutions)**
A. Article 280	(i) Administrative Tribunals
B. Article 324	(ii) Election Commission of India
C. Article 323	(iii) Finance Commission at Union level
D. Article 315	(iv) Union Public Service Commission

Codes :

	A	B	C	D
(a)	(i)	(ii)	(iii)	(iv)
(b)	(iii)	(ii)	(i)	(iv)
(c)	(ii)	(iii)	(iv)	(i)
(d)	(ii)	(iv)	(iii)	(i)

39. Which statement is not correct about the "National Education Day" of India? **[June-2010]**
(a) It is celebrated on 5th September every year.
(b) It is celebrated on 11th November every year.
(c) It is celebrated in the memory of India's first Union Minister of Education, Dr. Abul Kalam Azad.
(d) It is being celebrated since 2008.

40. Which option is not correct ? **[June-2010]**
(a) Most of the educational institutions of National repute in scientific and technical sphere fall under 64th entry of Union list.
(b) Education, in general, is the subject of concurrent list since 42nd Constitutional Amendment Act 1976.
(c) Central Advisory Board on Education (CABE) was first established in 1920.
(d) India had implemented the right to Free and Compulsory Primary Education in 2002 through 86th Constitutional Amendment.

41. As per the NCTE norms, what should be the staff strength for a unit of 100 students at B.Ed. level? **[June-2010]**
(a) 1 + 7 (b) 1 + 9
(c) 1 + 10 (d) 1 + 5

42. Who among the following appointed by the Governor can be removed by only the President of India ? **[December-2010]**
(a) Chief Minister of a State
(b) A member of the State Public Service Commission
(c) Advocate-General
(d) Vice-Chancellor of a State University

43. Which one of the following statements reflects the republic character of Indian democracy ? **[December-2010]**
(a) Written Constitution
(b) No State religion
(c) Devolution of power to local Government institutions
(d) Elected President and directly or indirectly elected Parliament

44. Which one of the following statements is not correct ? **[December-2010]**
(a) Indian Parliament is supreme.
(b) The Supreme Court of India has the power of judicial review.
(c) There is a division of powers between the Centre and the States.
(d) There is a Council of Ministers to aid and advise the President.

45. Which one of the following is not a Constitutional Body ? **[December-2010]**
(a) Election Commission
(b) Finance Commission
(c) Union Public Service Commission
(d) Planning Commission

46. Who among the following holds office during the pleasure of the President of India? **[June-2011]**
(a) Chief Election Commissioner
(b) Comptroller and Auditor General of India
(c) Chairman of the Union Public Service Commission
(d) Governor of a State

47. The President of India is **[June-2011]**
(a) the Head of State
(b) the Head of Government
(c) both Head of the State and the Head of the Government
(d) None of the above

48. Consider the following statements : **[June-2011]**
Identify the statement which implies natural justice.
(a) The principle of natural justice is followed by the Courts.
(b) Justice delayed is justice denied.
(c) Natural justice is an inalienable right of a citizen
(d) A reasonable opportunity of being heard must be given.

49. Most of the Universities in India are funded by **[June-2011]**
(a) the Central Government
(b) the State Governments
(c) the University Grants Commission
(d) Private bodies and Individuals

50. The members of Gram Sabha are **[December-2011]**
(a) Sarpanch, Upsarpanch and all elected Panchas
(b) Sarpanch, Upsarpanch and Village level worker
(c) Sarpanch, Gram Sevak and elected Panchas
(d) Registered voters of Village Panchayat

51. Constitutionally the registration and recognition of political parties is the function performed by **[December-2011]**
(a) The State Election Commission of respective States
(b) The Law Ministry of Government of India
(c) The Election Commission of India
(d) Election Department of the State Governments

52. Match the List – I with the List – II and select the correct answer from the codes given below : **[December-2011]**
List–I (Commissions and Committees)
A. First Administrative Reforms Commission
B. Paul H. Appleby Committee I
C. K. Santhanam Committee
D. Second Administrative Reforms Commission
List – II (Year)
(i) 2005 (ii) 1962
(iii) 1966 (iv) 1953
Codes :

	A	B	C	D
(a)	(i)	(iii)	(ii)	(iv)
(b)	(iii)	(iv)	(ii)	(i)
(c)	(iv)	(ii)	(iii)	(i)
(d)	(ii)	(i)	(iv)	(iii)

53. One-rupee currency note in India bears the signature of **[December-2011]**
(a) The President of India
(b) Finance Minister of India
(c) Governor, Reserve Bank of India
(d) Finance Secretary of Government of India

54. The President of India takes oath **[June-2012]**
(a) to uphold the sovereignty and integrity of India.
(b) to bear true faith and allegiance to the Constitution of India.
(c) to uphold the Constitution and Laws of the country.
(d) to preserve, protect and defend the Constitution and the law of the country.

55. The Fundamental Duties of a citizen include **[June-2012]**
1. Respect for the Constitution, the National Flag and the National Anthem
2. To develop the scientific temper.
3. Respect for the Government.
4. To protect Wildlife.
Choose the correct answer from the codes given below :
Codes :
(a) 1, 2 and 3 (b) 1, 2 and 4
(c) 2, 3 and 4 (d) 1, 3, 4 and 2

56. Who among the following created the office of the District Collector in India ? **[June-2012]**
(a) Lord Cornwallis
(b) Warren Hastings
(c) The Royal Commission on Decentralisation
(d) Sir Charles Metcalfe

57. Which of the following rights was considered the "Heart and Soul" of the Indian Constitution by Dr. B.R. Ambedkar? **[June-2012]**
(a) Freedom of Speech
(b) Right to Equality
(c) Right to Freedom of Religion
(d) Right to Constitutional Remedies

58. Match List – I with List – II and select the correct answer from the codes given below : **[December-2012]**

List – I	**List – II**
A. Poverty Reduction Programme	(i) Mid-day Meals
B. Human Development Scheme	(ii) Indira Awas Yojana (IAY)
C. Social Assistance Scheme	(iii) National Old Age Pension (NOAP)
D. Minimum Need Scheme	(iv) MNREGA

Codes :

	A	B	C	D
(a)	(iv)	(i)	(iii)	(ii)
(b)	(ii)	(iii)	(iv)	(i)
(c)	(iii)	(iv)	(i)	(ii)
(d)	(iv)	(iii)	(ii)	(i)

59. Which of the following can be done under conditions of financial emergency ? **[December-2012]**
1. State Legislative Assemblies can be abolished.
2. Central Government can acquire control over the budget and expenditure of States.
3. Salaries of the Judges of the High Courts and the Supreme Court can be reduced.
4. Right to Constitutional Remedies can be suspended.
Select the correct answer from the codes given below :
Codes :
(a) 1, 2 and 3 (b) 2, 3 and 4
(c) 1 and 2 (d) 2 and 3

60. Which of the following prefix President Pranab Mukherjee desires to be discontinued while interacting with Indian dignitaries as well as in official notings? **[December-2012]**
1. His Excellency **2.** Mahamahim
3. Hon'ble **4.** Shri/Smt.
Select the correct answer from the codes given below :
Codes :
(a) 1 and 3 (b) 2 and 3
(c) 1 and 2 (d) 1, 2 and 3

61. Which of the following statement(s) is/are not correct about the Attorney General of India ? **[December-2012]**
1. The President appoints a person, who is qualified to be a Judge of a High Court, to be the Attorney General of India.
2. He has the right of audience in all the Courts of the country.
3. He has the right to take part in the proceedings of the Lok Sabha and the Rajya Sabha.
4. He has a fixed tenure.
Select the correct answer from the codes given below :
Codes :
(a) 1 and 4 (b) 2, 3 and 4
(c) 3 and 4 (d) 3 only

62. In the warrant of precedence, the Speaker of the Lok Sabha comes next only to **[June-2013]**
(a) The President (b) The Vice-President
(c) The Prime Minister (d) The Cabinet Ministers

63. Which of the following statement(s) is/are correct about a Judge of the Supreme Court of India ? **[June-2013]**
1. A Judge of the Supreme Court is appointed by the President of India.
2. He holds office during the pleasure of the President.
3. He can be suspended, pending an inquiry.
4. He can be removed for proven misbehaviour or incapacity.
Select the correct answer from the codes given below :
Codes :
(a) 1, 2 and 3 (b) 1, 3 and 4
(c) 1 and 3 (d) 1 and 4

64. Which one of the following statements is not correct about the University Grants Commission (UGC) ? **[June-2013]**
(a) It was established in 1956 by an Act of Parliament.
(b) It is tasked with promoting and coordinating higher education.
(c) It receives Plan and Non-Plan funds from the Central Government.
(d) It receives funds from State Governments in respect of State Universities.

65. Press censorship in India was imposed during the tenure of the Prime Minister **[June-2013]**
(a) Rajeev Gandhi (b) Narasimha Rao
(c) Indira Gandhi (d) Deve Gowda

66. Bengal Gazette, the first Newspaper in India was started in 1780 by **[June-2013]**
(a) Dr. Annie Besant (b) James Augustus Hicky
(c) Lord Cripson (d) A.O. Hume

67. Consider the statement which is followed by two arguments (I) and (II) : **[June-2013]**
Statement: Should India switch over to a two party system?
Arguments:
(I) Yes, it will lead to stability of Government.
(II) No, it will limit the choice of voters.
(a) Only argument (I) is strong.
(b) Only argument (II) is strong.
(c) Both the arguments are strong.
(d) Neither of the arguments is strong.

68. G5 are the five most important emerging economies of world. Which one of the following does not form part of G5 ? **[September-2013]**
(a) Mexico (b) Brazil
(c) China (d) Korea

69. Which of the following statements about the Union Public Service Commission are correct? **[September-2013]**
1. UPSC is a Constitutional body.
2. It serves as an advisory body.
3. It is called upon to advise the Government in regard to representation of the Scheduled Castes and Scheduled Tribes in the Civil Service.
4. It is consulted on appointments of Chairman and members of Tribunals and Commissions.
Select the correct answer from the code given below :
Codes :
(a) 1, 2 and 3 (b) 1, 2 and 4
(c) 1, 3 and 4 (d) 1 and 2

70. Which of the following are the ways of acquiring Indian citizenship ? **[September-2013]**
1. Birth **2.** Descent
3. Naturalisation **4.** Incorporation of territory
Select the correct answer from the code given below :
Codes :
(a) 1 and 2 (b) 1 and 4
(c) 1, 2 and 3 (d) 1, 2, 3 and 4

71. In which of the following States the segment of population, which is in majority, enjoys the benefit of reservation of seats in the State Assembly ? **[September-2013]**
(a) Meghalaya and Mizoram
(b) Assam and Nagaland
(c) Madhya Pradesh and Assam
(d) Rajasthan and Arunachal Pradesh

72. Which of the following are voluntary provisions in the 73rd Constitutional Amendment Act (1992) ? **[September-2013]**
1. Minimum age of 21 for contesting elections to Panchayats.
2. Indirect elections to the post of Chairperson of Panchayats at the intermediate and district levels.
3. Representation of Members of Parliament and State Legislature on Panchayati Raj institutions.
4. Reservation of seats for backward classes.
Select the correct answer from the code given below :
Codes :
(a) 1, 2 and 4 (b) 2, 3 and 4
(c) 1, 2 and 3 (d) 3 and 4

73. Which of the following statements are correct about the National Advisory ouncil (NAC) ? **[September-2013]**
1. The National Advisory Council is a statutory body.
2. It is headed by the Prime Minister of India.
3. It facilitates constant interaction with the leaders of civil society.
4. It provides policy and legislative inputs to the Government of India.
Select the correct answer from the code given below :
Codes :
(a) 1, 2 and 3 (b) 2, 3 and 4
(c) 1, 3 and 4 (d) 3 and 4

74. Who among the following conducted the CNN-IBN – The Hindu 2013 Election Tracker Survey across 267 constituencies in 18 States? **[December-2013]**
(a) The Centre for the Study of Developing Societies (CSDS)
(b) The Association for Democratic Reforms (ADR)
(c) CNN and IBN
(d) CNN, IBN and The Hindu

75. Which of the following statements are correct about the Central Information Commission? **[December-2013]**
1. The Central Information Commission is a statutory body.
2. The Chief Information Commissioner and other Information Commissioners are appointed by the President of India.
3. The Commission can impose a penalty upto a maximum of ₹ 25,000/-
4. It can punish an errant officer.
Select the correct answer from the codes given below :
Codes :
(a) 1 and 2 only (b) 1, 2 and 4
(c) 1, 2 and 3 (d) 2, 3 and 4

76. Which of the following statements are correct? **[December-2013]**
1. There are seven Union Territories in India.
2. Two Union Territories have Legislative Assemblies
3. One Union Territory has a High Court.
4. One Union Territory is the capital of two States.
Select the correct answer from the codes given below :
(a) 1 and 3 only (b) 2 and 4 only
(c) 2, 3 and 4 only (d) 1, 2, 3 and 4

77. The power of the Supreme Court of India to decide disputes between two or more States falls under its **[December-2013]**
(a) Advisory Jurisdiction (b) Appellate Jurisdiction
(c) Original Jurisdiction (d) Writ Jurisdiction

78. Which one of the following Councils has been disbanded in 2013 ? **[December-2013]**
(a) Distance Education Council (DEC)
(b) National Council for Teacher Education (NCTE)
(c) National Council of Educational Research and Training (NCERT)
(d) National Assessment and Accreditation Council (NAAC)

79. Consider the statement which is followed by two arguments (i) and (ii).
Statement : India should have a very strong and powerful Lokpal.
Arguments :
(i) Yes, it will go a long way in eliminating corruption in bureaucracy.
(ii) No, it will discourage honest officers from making quick decisions. **[June-2014]**
Codes :
(a) Only argument (i) is strong.
(b) Only argument (ii) is strong.
(c) Both the arguments are strong.
(d) Neither of the arguments is strong.

80. Education as a subject of legislation figures in the **[June-2014]**
(a) Union List (b) State List
(c) Concurrent List (d) Residuary Powers

81. Who among the following is the de facto executive head of the Planning Commission? **[June-2014]**
(a) Chairman
(b) Deputy Chairman
(c) Minister of State for Planning
(d) Member Secretary

82. Which of the following statements are correct about a Central Universit y? **[June-2014]**
1. Central University is established under an Act of Parliament.
2. The President of India acts as the visitor of the University.
3. The President has the power to nominate some members to the Executive Committee or the Board of Management of the University.
4. The President occasionally presides over the meetings of the Executive Committee or Court.
Select the correct answer from the code given below :
Codes :
(a) 1, 2 and 4 (b) 1, 3 and 4
(c) 1, 2 and 3 (d) 1, 2, 3 and 4

83. Right to privacy as a Fundamental Right is implied in **[December-2014]**
(a) Right to Freedom
(b) Right to Life and Personal Liberty
(c) Right to Equality
(d) Right against Exploitation

84. The interval between two sessions of parliament must not exceed **[December-2014]**
(a) 3 months (b) 6 months
(c) 4 months (d) 100 days

85. Which of the following powers, the President has in relation to Lok Sabha? **[December-2014]**
1. Summoning
2. Adjournment- sine die
3. Prorogation
4. Dissolution
Select the correct answer from the codes given below :
(a) 1 and 4 (b) 1, 2 and 3
(c) 1, 3 and 4 (d) 1, 2, 3 and 4

86. Which of the following are the tools of good governance?
[December-2014]
1. Social Audit **2.** Separation of Powers
3. Citizen's Charter **4.** Right to Information
Select the correct answer from the codes given below:
(a) 1, 3 and 4 (b) 2, 3 and 4
(c) 1 and 4 (d) 1, 2, 3, and 4

87. The University Grants Commission was established with which of the following aims? **[June-2015]**
(A) Promotion of research and development in higher education
(B) Identifying and sustaining institutions of potential learning
(C) Capacity building of teachers
(D) Providing autonomy to each and every higher educational institution in India
Select the correct answer from the codes given below:
(a) (A), (B), (C) and (D) (b) (A), (B) and (C)
(c) (B), (C) and (D) (d) (A), (B) and (D)

88. Civil Service Day is celebrated in India on : **[June-2015]**
(a) 21st April (b) 24th April
(c) 21st June (d) 7th July

89. The session of the parliament is summoned by : **[June-2015]**
(a) The President
(b) The Prime Minister
(c) The Speaker of the Lok Sabha
(d) The Speaker of the Lok Sabha and the Chairman of the Rajya Sabha

90. Which among the following States has the highest number of seats in the Lok Sabha? **[December-2015]**
(a) Maharashtra (b) Rajasthan
(c) Tamil Nadu (d) West Bengal

91. The term of office of the Advocate General of a State is :
[December-2015]
(a) 4 years
(b) 5 years
(c) 6 years or 65 years of age whichever is earlier
(d) not fixed

92. Public Order as an item in the Constitution figures in :
[December-2015]
(a) the Union List (b) the State List
(c) the Concurrent List (d) the Residuary Powers

93. Which of the following statements are correct about Lok Sabha? **[December-2015]**
(A) The Constitution puts a limit on the size of the Lok Sabha.
(B) The size and shape of the Parliamentary Constituencies is determined by the Election Commission.
(C) First - past - the Post electoral system is followed.
(D) The Speaker of Lok Sabha does not have a casting vote in case of an equality of votes.
Select the correct answer from the codes given below:
(a) (A) and (C) (b) (A), (B) and (C)
(c) (A), (C) and (D) (d) (A), (B), (C) and (D)

94. The grounds on which discrimination in admission to educational institutions is constitutionally prohibited are :
[December-2015]
(A) Religion (B) Sex
(C) Place of birth (D) Nationality
Select the correct answer from the codes given below :
(a) (B), (C) and (d) (b) (A), (B) and (C)
(c) (A), (B) and (D) (d) (A), (B), (C) and (D)

95. Which of the following are the objectives of Rashtriya Uchchatar Shiksha Abhiyan (RUSA) ?
[December-2015]
(A) To improve the overall quality of state institutions.
(B) To ensure adequate availability of quality faculty.
(C) To create new institutions through upgradation of existing autonomous colleges.
(D) To downgrade universities with poor infrastructure into autonomous colleges.
Select the correct answer from the codes given below:
(a) (A), (B), (C) and (D) (b) (A), (B) and (C)
(c) (A), (C) and (D) (d) (A), (B) and (D)

96. The National Judicial Appointments Commission (NJAC) has been declared unconstitutional by
[July-2016]
(a) The Supreme Court of India
(b) The High Court
(c) The High Court and the Supreme Court both
(d) The President of India

97. Which of the following statements are correct in respect of Niti Aayog? **[July-2016]**
(A) It is a constitutional body.
(B) It is a statutory body.
(C) It is neither a constitutional body nor a statutory body.
(D) It is a think-tank.
Select the correct answer from the codes given below :
(a) (A) and (D) (b) (B) and (D)
(c) (C) and (D) (d) (B), (C) and (D)

98. Which of the following are the fundamental duties?
[July-2016]
(A) To respect the National Flag.
(B) To protect and improve the natural environment.
(C) For a parent to provide opportunities for education to his/her child.
(D) To protect monuments and places of national importance.
Select the correct answer from the codes given :
Codes :
(a) (A), (B) and (C) (b) (A), (B) and (D)
(c) (A), (C) and (D) (d) (A), (B), (C) and (D)

99. Which of the following statements about the Indian political system is/are correct? **[July-2016]**
(A) The President is both Head of the State and Head of the Government.
(B) Parliament is Supreme.
(C) The Supreme Court is the guardian of the Constitution.
(D) The Directive Principles of State Policy are justiciable.
Select the correct answer from the codes given below :
(a) (A), (B), (C) and (D) (b) (B), (C) and (D)
(c) (B) and (C) (d) (C) only

100. In which of the following cases, the principle of natural justice (Hear the other party) must be followed? **[August-2016]**
(A) Dismissal of an employee
(B) Supersession of a municipality
(C) Threat to national security
(D) Disciplinary action against a student or an employee
Select the correct answer from the codes given below :
Codes :
(a) (A) and (B) (b) (A) and (D)
(c) (A), (B) and (D) (d) (A), (B), (C) and (D)

101. Which of the following statement(s) is/are correct about the powers of the Governor of a State? **[August-2016]**
(A) He has the power to dissolve the Legislative Assembly.
(B) He has the power to appoint judges of the State High Court.
(C) He has the power to grant pardon in case of death sentence.
(D) He has diplomatic powers.
Select the correct answer from the codes given below :
Codes:
(a) (A) only (b) (A) and (B)
(c) (A), (B) and (D) (d) (A), (B) and (C)

102. Which of the following statements are not correct in respect of Rajya Sabha? **[August-2016]**
(A) It has same powers as those of Lok Sabha.
(B) It can pass a vote of no-confidence against the Council of Ministers.
(C) It can amend a money bill.
(D) It can be dissolved during emergency.
Select the correct answer from the codes given below :
Codes :
(a) (B) and (C) (b) (B), (C) and (D)
(c) (A), (B) and (C) (d) (A), (B), (C) and (D)

103. Which of the following are statutory bodies? **[August-2016]**
(A) Election Commission of India
(B) University Grants Commission (UGC)
(C) All India Council for Technical Education (AICTE)
(D) National Assessment and Accreditation Council (NAAC)
Select the correct answer from the codes given below :
Codes :
(a) (A), (B) and (C) (b) (B), (C) and (D)
(c) (B) and (C) (d) (B) and (D)

104. Instead of holding the office during the pleasure of the President who among the following hold (s) office during good behaviour ? **[January-2017]**
(A) Governor of a State
(B) Attorney General of India
(C) Judges of the High Court
(D) Administrator of a Union Territory
Select the correct answer from the codes given below :
Codes :
(a) (A) only (b) (C) only
(c) (A) and (C) (d) (A), (B), (C) and (D)

105. Which of the following are not necessarily the immediate consequences of the proclamation of the President's Rule in a State ? **[January-2017]**
(A) Dissolution of the State Assembly.
(B) Removal of the Council of Ministers in the State.
(C) Takeover of the State administration by the Union Government.
(D) Appointment of a new Chief Secretary.
Select the correct answer from the codes given below :
Codes :
(a) (A) and (D (b) (A), (B) and (C)
(c) (A), (B), (C) and (D) (d) (B) and (C)

106. Which of the following statements are correct ? **[January-2017]**
(A) Rajya Sabha is a permanent House which can be dissolved only during national emergency.
(B) Rajya Sabha does not represent the local interests of the States.
(C) Members of the Rajya Sabha are not bound to vote at the dictates of the states they represent.
(D) No Union territory has a representative in the Rajya Sabha.
Select the correct answer from the codes given below :
Codes :
(a) (A) and (D) (b) (B) and (C)
(c) (B), (C) and (D) (d) (A), (B), (C) and (D)

107. Which of the following come (s) within the ambit of the term 'corruption' ? **[November-2017]**
(A) Misuse of official position
(B) Deviation from rules, laws and norms
(C) Non-action when action is required
(D) Harm to public good
Select the correct answer from the code given below :
(a) (A) only (b) (A) and (B) only
(c) (A), (B) and (D) (d) (A), (B), (C) and (D)

108. Who among the following can be removed by the President without Parliament's resolution ? **[November-2017]**
(a) Judge of a High Court
(b) Governor of a State
(c) Chief Election Commissioner
(d) Comptroller and Auditor - General

109. Which of the following are the barriers to citizen-centric administration in India ? **[July-2018]**
(A) Wooden and inflexible attitude of the civil servants
(B) Ineffective implementation of laws and rules
(C) Awareness of rights and duties of citizens
(D) Lack of job opportunities for the youth
Select the correct answer from the code given below :
(a) (A), (B), (C) and (D) (b) (A), (B) and (C) only
(c) (A), (B) and (D) only (d) (A) and (B) only

110. Which of the following statements are correct about gender budgeting ? **[July-2018]**
(A) It is a separate budget addressing the specific needs of women.
(B) It assesses the impact of government budget on women.
(C) It is an accounting exercise.
(D) It is another budgeting innovation.
Select the correct answer from the code given below :
(a) (B) and (D) only (b) (A) and (D) only
(c) (A), (C) and (D) only (d) (B), (C) and (D) only

111. Leader of the Opposition is a member of committees which select : **[July-2018]**
(A) the Central Information Commissioner
(B) the Central Vigilance Commissioner
(C) the Chairperson of National Human Rights Commission
(D) the Chairperson of National Commission for Women Select the correct answer from the code given below :
(a) (A), (B), (C) and (D) (b) (A), (B) and (C) only
(c) (A), (C) and (D) only (d) (A), (B) and (D) only

112. Prime Minister Research Fellowship is for students pursuing Ph.D programme in : **[July-2018]**
(a) State and Central Universities
(b) Central Universities, IISc, IITs, NITs, IISERs and IIITs
(c) IISc, IITs, NITs, IISERs, IIITs, State and Central Universities
(d) IITs and IISc

113. The National Education Day is celebrated every year on : **[December-2018]**
(a) November 11 (b) November 14
(c) November 5 (d) November 25

114. The constitution of India provides right to establish educational institutes of their choice by all minorities as per: **[20th June 2019-Ist Shift]**
(a) Article 30 (1) (b) Article 29
(c) Article 38 (d) Article 16 (2)

115. The present form of inter university board that was previously established for promoting cooperation and coordination among universities is: **[24th June 2019-Ist Shift]**
(a) UGC (b) AIU
(c) NUEPA (d) ICSSR

116. The Education commission of India that first took serious note of the problem of Brain drain was: **[24th June 2019-Ist Shift]**
(a) The Education Commission of India
(b) The University Education Commission
(c) The Calcutta University Commission
(d) The Sargeant Commission

117. The report of which of the following Education Commissions carries the sub-title **'Education for National Development'**? **[24th June 2019-IInd Shift]**
(a) Radhakrishnan Commission
(b) Mudaliar Commission
(c) Calcutta University Education Commission
(d) Kothari Commission

118. Generally, who is the visitor of central universities of India? **[25th June 2019-IInd Shift]**
(a) Prime Minister of India
(b) Minister, MHRD
(c) President of India
(d) UGC Chairman

119. For the day to day administration of University, which of the following bodies is responsible? **[26th June 2019-Ist Shift]**
(a) Senate
(b) Syndicate/Executive council
(c) Student council
(d) Academic council

120. Which one of the following is a non-statutory body'? **[2nd Dec. 2019-Ist Shift]**
(a) National Council for Teacher Education (NCTE)
(b) Bar Council of India (BCI)
(c) Rehabilitation Council of India (RCI)
(d) National Assessment and Accreditation Council (NAAC)

121. Creation of World Class Universities requires: **[2nd Dec. 2019-IInd Shift]**
(i) Autonomous governance
(ii) Focused funding
(iii) Control over evaluation mechanism
(iv) Independent outcomes
(v) Appointment of staff by the State Machinery
Choose correct answer from the options given below:
(a) (i), (ii) and (v) (b) (ii),(iii) and (v)
(c) (iii), (iv) and (v) (d) (i),(ii) and (iv)

122. In which of the following, 'One Nation, One Standard' is mentioned as the 'mantra' to ensure national standards and quality. **[3rd Dec. 2019-Ist Shift]**
(a) National Policy on Education – 1968
(b) National Policy on Education – 1986
(c) National Policy for Skill Development and Entrepreneurship – 2015
(d) NITI Aayog – Three Year Action Agenda – 2017-18 to 2019-2020

123. The community colleges have provisions for **[3rd Dec. 2019-IInd Shift]**
(a) Single admission (b) Concurrent admission
(c) Self-financing system (d) Teaching at home

124. The WTO negotiation on higher education deals with issues like : **[3rd Dec. 2019-IInd Shift]**
(A) education as a free service
(B) vigorous social affirmation in developed countries
(C) assigning important role for civil society
(D) education as a trade
(E) education as a commodity
(F) withdrawal of public sector from higher education
Choose the correct answer from the options given below :
(a) (A), (C) and (D) (b) (A), (B) and (D)
(c) (B), (C) and (E) (d) (D), (E) and (F)

125. An institution desirous of applying for deemed to be university status must have been in existence for at least **[3rd Dec. 2019-IInd Shift]**
(a) 5 Years (b) 10 Years
(c) 20 Years (d) 25 Years

126. The objective of Indian Government behind setting up of HEFA (Higher Education Finance Agency) is to provide financial support for : **[3rd Dec. 2019-IInd Shift]**
(a) Improvement of infra structure in premier institutions of the country
(b) Research projects of faculty
(c) Research collaboration between Indian and Foreign Universities
(d) Research collaboration between Indian Institutions and Industry

127. International Computer Security Day is observed on **[3rd Dec. 2019-IInd Shift]**
(a) 18th July (b) 30th November
(c) 2nd December (d) 23rd December

128. The major barriers for access to higher education in India are: **[4th Dec. 2019-Ist Shift]**
(A) More opportunities of employment for less educated
(B) Government policies
(C) Language of instruction
(D) Economic status
(E) Competition from foreign universities
(F) Gender discrimination in society
Choose the correct answer from the options given below :
(a) (A), (B) and (C) (b) (B), (C) and (E)
(c) (C), (D) and (F) (d) (D), (E) and (F)

129. Regarding E-governance, which of the following statements is / are correct? **[4th Dec. 2019-IInd Shift**
(A) Decreasing transparency is an ICT enabled advantage of E-Governance.
(B) E-governance is related to the implementation of ICT in the government processes and functions.
(C) Common Service Centres (CSCs) help in providing and using E-Governance related services.
Choose the correct option :
(a) (A),(B), and (C) (b) (B) and (C) only
(c) (A) and (C) only (d) (A) and (B) only

130. Choose the institutions which are not authorized to confer degree according to UGC Act 1956: **[5th Dec. 2019-Ist Shift]**
(A) Institutions established under linguistic minority
(B) Deemed to be Universities
(C) Constituent Colleges
(D) Affiliated Colleges
Choose the correct option :
(a) (A), (B) and (D) only (b) (A), (B) and (C) only
(c) (B), (C) and (D) only (d) (A), (C) and (D) only

131. Which among the following is the statutory function of the UGC? **[6th Dec. 2019-IInd Shift]**
(a) To appoint teaching faculty in universities
(b) To control the conduct of examination in universities
(c) To determine and maintain the standards of teaching and research in universities
(d) To develop curriculum for university courses

132. Which among the following recommended the establishment of State Council for Higher Education in each state? **[6th Dec. 2019-IInd Shift]**
(a) Report of the Estimates Committee (1965–66)
(b) Review Committee on UGC (1977), Ministry of Education
(c) National Policy on Education (1986)
(d) Report of the UGC Committee (1990)

133. Given below are two statements - one is labelled as Assertion (A) and the other is labelled as Reason (R): **[4th Dec. 2019-IInd Shift**
Assertion **(A):** Government of India established higher educational statutory bodies to ensure quality of education.
Reason **(R):** There are some educational institutions in India which do not provide quality education.
In the context of above two statements, choose the correct option :
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(c) (A) is true, but (R) is false
(d) (A) is false, but (R) is true

134. Given below are two statements, one is labelled as Assertion (A) and the other labelled as Reason (R). **[5th Dec. 2019-Ist Shift]**
Assertion (A): The Governor has the power to ask for any information from the Chief Minister regarding the administration of the State.
Reason (R): The Governor is the real Head of the state administration.
In the context of the above two statements, choose the correct option :
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(c) (A) is true, but (R) is false
(d) (A) is false, but (R) is true

135. Given below are the statements — one is labelled as Assertion (A) and the other is labelled as Reason (R) : **[3rd Dec. 2019-IInd Shift]**
Assertion **(A):** Considering higher education as a non-priority for the state is linked to the withdrawal of public funding to it.
Reason **(R):** The pressure of free enterprise system in this regard is an attempt to expand their educational market.
In the light of above two statements. Choose the correction option :
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true and (R) is not the correct explanation of (A)
(c) (A) is true, but (R) is false
(d) (A) is false. but (R) is true

GP_4358

HINTS & EXPLANATION

1. **(a)** Economic planning, the process by which key economic decisions are made or influenced by central governments. The welfare state refers to a type of governing in which the national government plays a key role in the protection and promotion of the economic and social well-being of its citizens.

2. **(b)** The election commission has the right to allow symbols to the political parties. It gives recognition to the national parties, state parties and regional parties. It set limits on poll expenses. The commission prepare electoral rolls and update the voter's list from time to time.

3. **(c)** B.R. Mehta Committee, 1957 recommended the establishment of the scheme of 'democratic decentralisation' which finally came to be known as Panchayati Raj.

4. **(c)** On July 31, 1937, Gandhi had published an article in the Harijan. Based upon this article, an all India National Education Conference was held October 22 and 23, 1937. The conference is called Wardha Educational Conference and the president of this conference was Gandhi himself.

5. **(b)** The National Policy on Education (N.P.E.). 1986 constituted 23 Task Forces, comprising eminent educationists, experts and senior representatives of Central and State Governments, and assigned each of them a specific task to be accomplished in a particular domain.

VOCATIONALISATION OF EDUCATION or turning education into training for various vocations/ professions was one of these. Statistically, only about 2.5% of students population entering higher secondary stage was covered by vocationalisation till then; and progress of vocationalisation of school education was slow due to lack of opportunities for the pass-outs for their professional growth and career advancement. So, the thrust was on taking urgent steps to strengthen the vocational education system; and devising effective strategies for providing opportunities.

6. **(a)** Equally important

7. **(c)** The minimum age limit for a person to be elected as the president of India is 35 years.

8. **(b)** System adopted for the election of the President of India as Single Transferable vote system.

9. **(a)** The President is the official Head of State, and is chosen with the help of an indirect election process by an electoral college consisting of the elected members of the Parliament of India and the Legislative Assemblies of the States and the Union Territories of Delhi and Puducherry.

10. **(d)** The President of India is indirectly elected by an electoral college consisting of the elected members of both houses of parliament, the elected members of the Legislative assemblies of the 29 states and the elected members of the legislative assemblies of the Union Territories of Delhi and Puducherry.

11. **(c)** The Lok Sabha may be dissolved before the expiry of its term by the President on the advice of the Prime Minister. During national emergency, the life of the Lok Sabha may be extended by the President beyond five years for one year at a time. The new Lok Sabha must be elected within six months after the national emergency is lifted.

12. **(d)** The Constitution (Eighty-sixth Amendment) Act, 2002 inserted Article 21-A in the Constitution of India to provide free and compulsory education of all children in the age group of six to fourteen years as a Fundamental Right in such a manner as the State may, by law, determine.

13. **(d)** The State List or List-ll is a list of 61 items (Initially there were 66 items in the list) in Schedule Seven to the Constitution of India. The legislative section is divided into three lists: Union List, State List and Concurrent List. Unlike the federal governments of the United States, Switzerland or Australia, residual powers remain with the Union Government, as with the Canadian federal government.

14. **(b)** 'SITE' stands for Satellite Instructional Television Experiment. It was an experimental satellite communications project launched in India in 1975, designed jointly by NASA and the Indian Space Research Organization (ISRO).

15. **(a)** Tripura is the smallest among four given states of northeast in India with 10,486 Sq. Km. area.

16. **(c)** The Solicitor General of India can be asked to make a statement in Indian Parliament. He is below the Attorney General for India, who is the Indian government's chief legal advisor, and its primary lawyer in the Supreme Court of India.

17. **(c)** According to Article 71 of the Constitution, all doubts and disputes arising out of or in connection with the election of a President or Vice-President shall be inquired into and decided by the Supreme Court.

18. **(b)** Parliament – Enactment of Budget

C & A.G. – Legality of expenditure

Ministry of Finance – Formulation of Budget

19. **(c)** Article 30 is classified under Part III of the Indian Constitution that elucidates all the Fundamental Rights guaranteed to the citizens of India irrespective of their religion, caste and sex. Article 30 upholds the right of the minorities "to establish and administer educational institutions."

20. **(d)** Article 19(l) (a) of Indian Constitution says that all citizens have the right to freedom of speech and expression. Freedom of Speech and expression means the right to express one's own convictions and opinions freely by words of mouth, writing, printing, pictures or any other mode.

21. **(a)** The Press Council consists of a Chairman and 28 other members. Of the 28 members, 13 represent the working journalists.

22. **(d)** Autonomy in higher education implies freedom in Curriculum development. Academic autonomy is the freedom to decide academic issues like curriculum, instructional material, pedagogy, techniques of students' evaluation.

23. **(d)** The National Assessment and Accreditation Council (NAAC) was established in 1994 as an autonomous institution of the University Grants Commission (UGC) with its Head Quarter in Bengaluru.

24. **(c)** The legislative section is divided into three lists: Union List, State List and Concurrent List. The Concurrent List or List-lll (Seventh Schedule) is a list of 52 items (though the last item numbered 47) given in the Seventh Schedule to the Constitution of India.

Executing Departments – Implementation of Budget

25. **(b)** Election of Rural and Urban local bodies are conducted and ultimately supervised by State Election Commission.

26. **(d)** National Law Institute – Hyderabad

Indian Institute of Advanced Studies – Shimla

National Judicial Academy – Bhopal

National Savings Institute – Nagpur

27. **(d)** Eminent filmmaker and pioneer of alternative cinema Mrinal Sen was felicitated with the Lifetime Achievement Award at the 10th edition of the Osian's Cinefest Film Festival 2008 in New Delhi.

28. **(d)** Judicial activism refers to judicial rulings that are suspected of being based on personal opinion, rather than on existing law. The question of judicial activism is closely related to constitutional interpretation, statutory construction, and separation of powers.

29. **(a)** The parliament of India passed the (Thirteen Amendment) Act, 1962, and inserted Article 371 (A) on the eve of the creation of the new state of Nagaland. The Amendment was necessitated to fulfill the aspiration of the people of the then Naga Hills — Tuensang Area and to facilitate the creation of the 16th State of Indian Union.

30. **(d)** The Directive Principles are contained in Part IV (Article 36-51) of the Constitution of India, are not enforceable by any court, but the principles laid down therein are considered irrefutable in the governance of the country. They relate to social justice, economic welfare, foreign policy, and legal and administrative matters.

31. **(b)** Chandrayaan-1, India's first mission to Moon, was launched on October 22, 2008 from SDSC SHAR, Sriharikota.

32. **(c)** It is a bicameral legislature composed of the President of India and the two houses: the Rajya Sabha (Council of States) and the Lok Sabha (House of the People).

33. **(c)** Article 120: Language to be used in Parliament - (1) Notwithstanding anything in part XVII, but subject to the provisions of article 348, business in Parliament shall be transacted in Hindi or in English.

34. **(b)** The recommendation of National Knowledge Commission for the establishment of 1500 Universities is to ensure increase in student enrolment in higher education.

35. **(c)** **Primary data:** Data collected by the investigator himself/herself for a specific purpose.

Secondary **data:** Data collected by someone else for some purpose but being utilized by the investigator for another purpose.

Statistical Abstracts of India, now called Statistical Year Book of India is a yearly publication of The Ministry of Statistics and Programme Implementation containing statistical abstracts compiled from data collected for various purposes in different areas of governance. All the other are collected for the very purpose and are primary sources of data.

36. **(a)** Right to Information Act 2005 mandates timely response to citizen requests for government information. The act empowers every citizen to seek any information from the Government, inspect any Government documents and seek certified photocopies thereof.

37. **(c)** Private universities are approved by the UGC. They can grant degrees but they are not allowed to have off-campus affiliated colleges in the country or abroad without the permission of UGC.

38. **(b)** Article 280 in The Constitution Of India 1949 – Finance Commission at Union level

Article 324 – Superintendence, direction and control of elections to be vested in an Election Commission

Article 323 – Administrative Tribunals

Article 315 – Union Public Service Commission

39. **(a)** The nation celebrates the National Education Day on November 11 as a mark of respect to Maulana Abul Kalam Azad. He strongly advocated the education of women.

40. **(b)** Through the 42nd Amendment Act of 1976 Five subjects were transferred from State to Concurrent List. They are Education; Forests; Weights & Measures; Protection of Wild Animals and Birds; Administration of Justice.

41. **(c)** As per the NCTE norms, the staff strength for a unit of 100 students at B.Ed. level is 1+10

42. **(b)** (1) Subject to the provisions of clause (3), the Chairman or any other member of a Public Service Commission shall only be removed from his office by order of the President on the ground of misbehaviour after the Supreme Court, on reference being made to it by the President, has, on inquiry held in accordance with the procedure prescribed in that behalf under article 145, reported that the Chairman or such other member, as the case may be, ought on any such ground to be removed.

43. **(d)** Democracy is a system of government that allows the citizens to cast vote and elect a government of their choice. Democracy in India gives its citizens the right to vote irrespective of their caste, colour, creed, religion and gender.

44. **(a)** Though the Parliament of India is the supreme legislative body of the Republic of India, the legislation passed by parliament may be challenged in Supreme Court. The Parliament is composed of the President of India and the houses. It is a bicameral legislature with two houses: the Rajya Sabha (Council of States) and the Lok Sabha (House of the People).

45. **(d)** The Planning Commission is a non-constitutional and non-statutory body and is responsible to formulate five years plan for social and economic development in India.

46. **(b)** The appointment to all constitutional posts is made by the President of India. This includes the Chief justice, the Election Commissioner, the CVC and the Chairman of the UPSC and also the officers of All India Services. Chairman of the Union Public Service Commission holds office during the pleasure of the President of India.

47. **(c)** Article 145 & Article 317 empower the process of removal of the current chairman of UPSC such as: He can be removed from his office only by order of "The President of India," on the ground of misbehaviour based on the reference of the Supreme Court.

48. **(b)** The statement 'Justice delayed is justice denied' implies natural justice. In India, the principles of natural justice are firmly grounded in Article 14 & 21 of the Constitution. With the introduction of concept of substantive and procedural due process in Article 21, all that fairness which is included in the principles of natural justice can be read into Article 21.

49. **(c)** The University Grants Commission of India (UGC India) is a statutory body set up by the Indian government in accordance to the UGC Act 1956. The most number of universities are funded in India by UGC.

50. **(d)** The members of Gram Sabha are Registered voters of Village Panchayat. The Gram Sabha members also elect the representatives to the Gram Panchayat. Together the Sarpanch and Panchs form a Gram Panchayat. A Gram Panchayat is elected for five years.

51. **(c)** Constitutionally the registration and recognition of political parties is the function performed by Election Commission of India.

52. **(b)** First Administrative Reforms – 1966
Paul H. Appleby Committee – 1953
K. Santhanam Committee – 1962
Second Administrative Reforms Commission – 2005

53. **(d)** One-rupee currency note in India bears the signature of Finance Secretary of Government of India.

54. **(d)** The President of India takes oath to preserve, protect and defend the Constitution and the law of the country.

55. **(b)** The Fundamental Duties of a citizen include all the listed duties except for respect for the government.

56. **(b)** Warren Hastings introduced the office of the district collector in 1772. District administration in India is a legacy of the British Raj. District collectors were members of the Indian Civil Service and were charged with supervising general administration in the district.

57. **(d)** Article 32 of the Indian Constitution was described the Right to Constitutional Remedies as the heart and soul of the Indian Constitution by Dr. B.R. Ambedkar.

58. **(a)** The correct match is -
Poverty Reduction Programme – MNREGA
Human Resource Development Scheme–Mid-day Meal
Social Assistance Scheme–National Old Age Pension (NOAP)
Minimum Need Scheme– Indira Awas Yojana (IAY)

59. **(d)** In case of a financial emergency, the President can reduce the salaries of all government officials, including judges of the Supreme Court and High Courts. All money bills passed by the State legislatures are submitted to the President for his approval. He can direct the state to observe certain principles (economy measures) relating to financial matters; but fundamental rights cannot be suspended.

60. **(c)** Ex President Pranab Mukherjee desires to be discontinued the prefixes 'His Excellency and Mahamahim' while interacting with Indian dignitaries as well as in official notings.

61. **(a)** The Attorney General for India is appointed by the President of India under Article 76 (1) of the Constitution and holds office during the pleasure of the President. He is Indian government's chief legal adviser, and its primary lawyer in the Supreme Court of India. The President appoints a person, who is qualified to be a Judge of a High Court, to be the Attorney General of India. It has become a tradition that the Attorney General resigns when a new government is formed. The Attorney General is selected by the Government and acts as its advocate, and hence is not a neutral person.

62. **(c)** The Speaker is looked upon as the true guardian of the traditions of parliamentary democracy. Her unique position is illustrated by the fact that she is placed very high in the Warrant of Precedence in our country, standing next only to the Prime Minister.

63. **(d)** A Judge of the Supreme Court is appointed by the President of India and he can be removed for proven misbehaviour or incapacity.

64. **(d)** The University Grants Commission (UGC) does not receive funds from State Governments in respect of State Universities.

65. **(c)** Press censorship in India was imposed during the tenure of the Prime Minister Indira Gandhi in 1975-77 during Emergency.

66. **(b)** Bengal Gazette, the first Newspaper in India was started in 1780 by James Augustus Hicky. It was published in English language.

67. **(c)** Both the arguments (i) and (ii) are strong.

68. **(d)** Korea does not form part of G5. The G5 are considered to be the five largest emerging economies which are – Brazil, China, India, Mexico and South Africa.

69. **(d)** The Union Public Service Commission (UPSC) is an independent recruiting agency of Union and performs other functions as provided by the constitution. The UPSC shall be consulted on all matters relating to - methods of recruitment to civil services and for civil posts; making appointments to civil services and posts; making promotions and transfers from one service to another; the suitability of candidates for such appointments, promotions or transfers, etc.

70. (d) Following are the ways of acquiring Indian citizenship:
- Citizenship by Birth
- Citizenship by Descent
- Citizenship by Registration
- Citizenship by Naturalisation
- Citizenship by incorporation of Territory
- Amendment in the Citizenship Act

71. (a) Meghalya and Mizoram enjoy the benefit of reservation of seats in their respective state assemblies. The regions of Meghalaya are represented in the Assembly, with 29 members elected from Khasi Hills, 7 from Jaintia Hills and 24 from Garo Hills. The Mizoram Legislative Assembly is the unicameral state legislature of Mizoram state in north-eastern India. The seat of the Legislative Assembly is at Aizawl, the capital of the state. The Legislative Assembly comprises 40 Members of Legislative Assembly directly elected from single-seat constituencies.

72. (d) Giving representation to members of the Parliament (both the Houses) and the state legislature (both the Houses) in the panchayats at different levels falling within their constituencies; providing reservation of seats (both members and chairpersons) for backward classes in panchayats at any level.

73. (d) The National Advisory Council (NAC) of India was an advisory body set up by the first UPA government to advise the Prime Minister. Sonia Gandhi served as its Chairperson for much of the tenure of the UPA.

74. (a) The Centre for the Study of Developing Societies (CSDS) conducted the CNN-IBN - The Hindu 2013 Election Tracker Survey across 267 constituencies in 18 States. The CNN-IBN- The Hindu Election Tracker Survey, was conducted by the Centre for the Study of Developing Societies (CSDS).

75. (c) The Central Information Commission (CIC) set up under the Right to Information Act is the authorised body, established in 2005. The jurisdiction of the Commission extends over all Central Public Authorities.

76. (d) All statements are correct.

77. (c) The Supreme Court has original, appellate and advisory jurisdiction. Its exclusive original jurisdiction extends to any dispute between the Government of India and one or more States or between the Government of India and any State or States on one side and one or more States on the other or between two or more States, if and insofar as the dispute involves any question (whether of law or of fact) on which the existence or extent of a legal right depends.

78. (a) In June 2013, University Grants Commission has taken over DEC, by establishing Distance Education Bureau which will govern the distance education programs in India.

79. (a) Argument (ii) offers a self-contradiction, because an honest officer will have no reason to be afraid of the Lokpal and hence, will not hesitate from taking decisions.

80. (c) Education is a subject which touches every person, every family and every institution in this country. ... Because it is such a sensitive subject, any reform of the education process must be handled with great sensitivity and care. Education came into the Concurrent List way back in 1976.

81. (b) The Prime Minister of India is the ex-officio chairman of the Planning Commission. The Deputy Chairman is the de-facto executive head.

82. (c) Central universities Act, as established by an Act of Parliament, are under the purview of the Department of Higher Education in the Union Human Resource Development Ministry. The President of India acts as the 'Visitor' of the University; and with the assistance of the MHRD, nominates VC's and Court/Executive Committee/ Board of Management/Selection Committee nominees.

83. (b) "Right to Privacy is an integral part of Right to Life and Personal Liberty guaranteed in Article 21 of the Constitution," the SC's nine-judge bench + ruled unanimously. It added that the right to privacy is intrinsic to the entire fundamental rights chapter of the Constitution.

84. (b) The maximum gap between two sittings should not be more than 6 months. That means, The parliament should meet at least twice a year.

85. (c) President has power to summon or prorogue the two houses of parliament. After a prorogation, the house must be summoned within 6 months. The President may dissolve the Lok Sabha. (Rajya Sabha is never dissolved). The power of adjournment and adjournment sine die lies with the speaker.

86. (d) An institutional set up that ensures good governance usually has the following features:
- Participation
- Rule of Law
- Transparency
- Responsiveness
- Consensus Orientation
- Equity
- Effectiveness and Efficiency
- Accountability

87. (b) The University Grants Commission (UGC) came into existence with the aim of the coordination, determination and maintenance of standards of teaching, examination and research in university education.

88. (a) The Civil Service Day is celebrated on 21 April every year. The purpose for this day is to rededicate and recommit themselves to the cause of the people. It is observed by all Civil Services.

89. (a) The President has the power to summon and prorogue either House of Parliament or to dissolve Lok Sabha.

90. (a) Maharashtra has 48 seats among all these states.

91. (d) The term of office of the advocate general is not fixed by the Constitution. The Office of the Advocate General is a constitutional office created under Article 165 of the Constitution of India. The Governor of the State appoints a person who is qualified to be appointed as a judge of the High Court as Advocate General of the State.

92. (b) Public order as an item in the constitution figures in the state list under seventh schedule of the constitution.

93. (a) The maximum strength of the House allotted by the Constitution of India is 552. Currently the house has 545 seats; the house is made up by election of up to 543 elected members and at a maximum 2 nominated members of the Anglo-Indian Community by the President of India. A first-past-the-post (FPTP) voting method is one in which voters chooses a candidate of their choice on a ballot, and the candidate who receives the most votes wins: this is described as winner takes all. First Past the Post (FPTP) is a legacy of British government in India.

94. (b) Article 15 secures the citizens from every sort of discrimination by the State, on the grounds of religion, race, caste, sex or place of birth or any of them.

95. (b) Rashtriya Uchchatar Shiksha Abhiyan (RUSA) aims to provide equal development to all higher institutions and rectify weaknesses in the higher education system. The major objectives are

- To Improve the overall quality of state institutions
- To ensure availability of quality faculty
- To downgrade universities with poor infrastructure into autonomous colleges, among others.

96. (a) The Constitution Bench of Supreme Court on 16 October 2015 by 4:1 Majority upheld the collegium system and struck down the NJAC as unconstitutional after hearing the petitions filed by several persons and bodies with Supreme Court Advocates on Record Association (SCAoRA) being the first and lead petitioner.

97. (c) NITI Aayog is not a constitutional body nor is it a statutory body. However, it has been formed by a cabinet resolution as was the case in erstwhile yojana Aayog or planning commission .It's an advisory body and it is a think tank in terms of five years planning.

98. (a) The Fundamental Duties of citizens were added to the Constitution by the 42nd Amendment in 1976, upon the recommendations of the Swaran Singh Committee which was constituted by the government.

99. (d) The Supreme Court is called the guardian of the Constitution as it protects the fundamental rights of citizens from being getting violated by any organ of the government. The Directive Principles of State Policy contained in Part IV, Articles 36-51 of the Indian constitution constitute the most interesting and enchanting part of the constitution. The idea of directives being included in the constitution was borrowed from the constitution of Ireland. The Directive Principles are non-justifiable in nature because they are not legally enforceable by the courts for their violation.

100. (c) In the event of threat to national security, the principle of natural justice (Hear the other party) must be followed.

101. (a) A governor in India does not have the power to appoint judges of the State High Court. He also does not have the power to grant pardon in case of death sentence. Governor has no diplomatic powers.

102. (d) All the statements (A), (B), (C) and (D) are wrong.

103. (c) The University Grants Commission of India (UGC India) is a statutory body set up by the Indian Union government in accordance to the UGC Act 1956 under Ministry of Human Resource Development. The All India Council for Technical Education (AICTE) is the statutory body and a national-level council for technical education, under Department of Higher Education, Ministry of Human Resource Development.

104. (c) The Constitution provides that a judge of the High Court can be removed only by an order of the President, based on a motion passed by both Houses of Parliament. The procedure for removal of judges is elaborated in the Judges Inquiry Act, 1968.

105. (a) The dissolution of the State Assembly and appointment of a new Chief Secretary are not the immediate consequences of the proclamation of the President's Rule in a State.

106. (b) Rajya Sabha does not represent the local interests of the States. Members of the Rajya Sabha are not bound to vote at the dictates of the states they represent. Members of the Rajya Sabha are not bound to vote at the dictates of the states they represent.

107. (d) All these factors misuse of official position; deviation from rules, laws and norms; non-action when action is required; harm to public good come within the ambit of the term 'corruption.'

108. (b) Governor of a State can be removed by the President without Parliament's resolution since a Governor holds office at the "pleasure of the President."

109. (d) (A) and (B) only

Good governance is citizen centric.

Barriers to good governance are:

- Attitudinal Problems of the Civil Servants
- Lack of Accountability
- Red Tapism
- Low levels of Awareness of the Rights and Duties of Citizens
- Ineffective Implementation of Laws and Rules

110. (a) (B) and (D) only

The Ministry of Women and Child Development says, Gender Budgeting is a powerful tool for achieving gender mainstreaming so as to ensure that benefits of development reach women as much as men. It is not an accounting exercise but an ongoing process of keeping a gender perspective in policy/ programme formulation, its implementation and review. GB entails dissection of the Government budgets to establish its gender differential impacts and to ensure that gender commitments are translated in to budgetary commitments.

The rationale for gender budgeting arises from recognition of the fact that national budgets impact men and women differently through the pattern of resource allocation. Women, constitute 48% of India's population, but they lag behind men on many social indicators like health, education, economic opportunities, etc. Hence, they warrant special attention due to their vulnerability and lack of access to resources. The way Government budgets allocate resources, has the potential to transform these gender

inequalities. In view of this, Gender Budgeting, as a tool for achieving gender mainstreaming, has been propagated.

111. (b) (A), (B) and (C) only

The leader of the Opposition (LoP) is a member of several committees that are entrusted with the task of selecting/appointing certain functionaries. Some of these are as under:

CIC (Central Information Commission)is constituted by (i) The Prime Minister, who shall be the Chairperson of the committee; (ii) the Leader of Opposition in the Lok Sabha ; and(iii) a Union Cabinet Minister to be nominated by the Prime Minister.

CVC (Central Vigilance Commission)is constituted by (i) The Prime Minister; (ii) The Union Home Minister; (iii) the Leader of Opposition in the Lok Sabha.

NHRC (National Human rights Commission) is constituted by the President of India, on the recommendation of a committee consisting of (i)The Prime Minister (Chairperson); (ii)the Union Home Minister; (iii)the Leader of the Opposition in the Lok Sabha

NCW (National Commission for Women)is constituted by the central government.

112. (d) IITs and IISc

As per the Ministry of Human Resource Development, Government of India, that grants the Prime Minister's Research Fellowship, the applicants for the Fellowship should have completed or be pursuing the final year of four (or five) year undergraduate or five year integrated M.Tech or five year integrated M.Sc. or 2 year M.Sc. or five year undergraduate-postgraduate dual degree programs in Science and Technology streams from IISc/IITs/NITs/IISERs/IIEST and centrally funded IIITs with prescribed Cumulative Grade Point Average (CGPA)/Cumulative Performance Index(CPI).

113. (a) National Education Day of India is celebrated on 11 November every year. It is an annual observance in India to commemorate the birth anniversary of Maulana Abul Kalam Azad, the first education minister of independent India, who served from 15 August 1947 until 2 February 1958.

114. (a) As per the Article 30(1) of the Indian constitution, all minorities, whether based on religion or language, shall have the right to establish and administer educational institutions of their choice. Article 30(1A) deals with the fixation of the amount for acquisition of property of any educational institution established by minority groups.

115. (b) The Inter-University Board (IUB) of India subsequently formed on March 23, 1925, to promote university activities, by sharing information and co-operation in the field of education, culture, sports and allied areas. The Board acquired a legal status with its registration in 1967 as a society under the Societies Registration Act, 1860. In 1973, it assumed it present name "The Association of Indian University (AIU)."

116. (d) The Sargeant Commission.

117. (d) The sub-title of the Kothari commission report which was constituted in 1964 was education for national development. The terms of reference of the commission was to formulate the general principles and guidelines for the development of education from primary level to the highest and advise the government on a standardized national pattern of education in India.

118. (c) As per Central Universities Act, 2009, The President of India is the Visitor of the University. The Visitor have the right to cause an inspection to be made by such person or persons, as he may direct, of the University, its buildings, libraries, laboratories and equipment, and of any College or Institution maintained by the University; and also of the examinations, teaching and other work conducted or done by the University and to cause an inquiry to be made in like manner in respect of any matter connected with the administration or finances of the University, Colleges or Institutions.

119. (b) A university functions quite efficiently and effectively through its executive councils. It recommends general policies and otherwise advice the President, the provost, and officers of the University. The Executive Council shall have the management and administration of the revenue and property of the University and the conduct of all administrative affairs of the University.

120. (d) National Assessment and Accreditation Council (NAAC) was established in 1994 as an autonomous institution of the University Grants Commission (UGC) with its Head Quarter in Bengaluru. The National Assessment and Accreditation Council (NAAC) conducts assessment and accreditation of Higher Educational Institutions (HEI) such as colleges, universities or other recognised institutions to derive an understanding of the 'Quality Status' of the institution.

121. (d) The world class universities play key roles in creating and disseminating knowledge, educating a highly skilled workforce for technological and intellectual leadership, and serving the needs of society. For the creation of world class universities, world class faculty with high salary is required. Universities have a complete autonomy and sufficient funds are provided by the government. High budgets allow them to have a concentration of top ranking faculty and quality students, along with world-class equipment. Independent outcomes and evaluation mechanism should also be required for the creation of world class University.

122. (c) National Policy on Skill Development and Entrepreneurship, 2015 aimed to provide an umbrella framework to all skilling activities being carried out within the country, to align them to common standards (One Nation one Standard) and link the skilling with demand centres.

123. (b) A community college is an institution under India's higher education system that aims at providing job-oriented education to students from local communities. Its special features are as follows:

- Provides accessible and affordable education in the form of skill-based and traditional courses to a large number of students of the community.
- Offers courses to students in multiple formats including face-to-face, online, full-time, and part-time.
- Provides better options for students who desire career-oriented qualification and may not require a three-year degree course.

Allows dual enrolment, or concurrent admission, thereby, enabling high school students to take up courses in community colleges to reduce the duration and costs of obtaining an associate full degree.

124. (d) The Government of India (GOI) has expressed its readiness to allow educational traders from all over the world i.e. 160 member-nations of World Trade Organisation (WTO) to establish colleges, universities and other technical or professional institutions in India as commercial ventures. The WTO regime considers education as a tradable service and a commodity and student as a customer in clear legal terms.

125. (c) As per the new circular of UGC, an institutes should have been functional for minimum 20 years to be eligible for deemed to be University status. It also has to be among top 50 in any specific category or among top 100 in the overall ranking of the National Institute Ranking Framework (NIRF). Once the status is granted, the UGC will monitor the academic outcomes of the institutes on annual basis. The outcome of graduate students should not be lesser than 50% and the teacher-student ratio should not drop below 1:20.

126. (a) Higher Education Financing Agency (HEFA) is a joint venture company of Canara Bank and Ministry of Human Resource Development GoI. HEFA provides financial assistance for creation of educational infrastructure. It provides timely finance at low interest rates for capital assets creation in India's higher education institutions.

127. (b) International Computer Security Day (ICSD) is celebrated every year on 30th November. It aims to raise awareness and remind society about the importance of protecting both company and personal computer resources in order to prevent the misuse of financial and personal data, and even identity theft.

128. (c) More opportunities of employment for less educated, Government policies, and competition from foreign universities make access to Higher education easier.

Language of instruction in Higher Education is mostly English which is a deterrent for a large number of students from vernacular mediums. Economic status is a barrier because higher education is expensive and unaffordable for those having humble means. Gender discrimination in society results in less women enrolling for Higher Education. More opportunities of employment for less educated, Government policies, and competition from foreign universities facilitate access to Higher education.

129. (b) The "e" in e-Governance stands for 'electronic'. It can be defined as th96e application of information and communication technology (ICT) for providing government services, exchange of information, transactions, integration of previously existing services and information portals. The CSCs are Information and Communication Technology (ICT) enabled kiosks with broadband connectivity to provide various Governments, private and social services at the doorstep of the citizen.

130. (d) As per the Section 22 in the University Grants Commission Act, 1956, the right of conferring or granting degrees shall be exercised only by a University established or incorporated by or under a Central Act, a Provincial Act or a State Act or an institution deemed to be a University under section 3 or an institution specially empowered by an Act of Parliament to confer or grant degrees. In the given options only Deemed to be Universities are provided to confer degree.

131. (c) The main aim & role of UGC in higher education is to provide funds to universities and coordinate, determine & maintain the ethics in institutions of higher education.

132. (c) The National Policy of Education of 1986 and Programme of Action of 1992 provided a significant formulation regarding the content and process of education. District Institutes of Education and Training (DIET) should be established with the capability to organize pre-service and in-service courses for elementary school teachers and for the personnel working in non-formal and adult education. As DIETs get established, sub-standard institutions should be phased out. Selected Secondary Teacher Training Colleges should be upgraded to complement the work of the State Councils of Educational Research and Training.

133. (a)

134. (c) As per the provision of Article 153, there shall be a Governor for each State. Like the President at the Centre, Governor in the state is only a constitutional ruler. He has the right to seek information from Chief Minister and it is the duty of the Chief Minister of the State to inform him of all decisions of his ministry.

135. (a) When a ministry/department/sector is a public/state concern, the government is also responsible for the funding necessary for its operation. So when public funding is withdrawn, it signifies it is a non-priority for the State/Government. So, Assertion (A) is true. The withdrawal of public funding is a scenario related to pressure from free enterprise system attempting to expand their market in the education sector. So, (R) is the correct explanation of (A).